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The Relationship Between the Surgeon and the Anesthetist

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Anesthesia was born into the practice of medicine amidst doubt and disbelief. Skepticism was based upon a previously unsuccessful demonstration by Dr. Horace Wells at the Harvard Medical School. Dr. Wells was a dentist who in 1844 had one of his own teeth extracted by a dental associate while under the influence of nitrous oxide anesthesia. W. T. G. Morton, who had been an associate of Wells, was later as a medical student associated with C. T. Jackson. Supposedly it was Jackson who suggested that ether rather than nitrous oxide be employed as an anesthetic agent. It is understandable, therefore, that at the first public administration of ether anesthesia held at the Massachusetts General Hospital on October 16, 1846, John Collins Warren, the operating surgeon, was reported to have said to the assembled doctors, "Gentlemen, this is no humbug."[1] This well-known remark of Dr. Warren's is probably one of the greatest understatements in the history of medicine. For on that day was demonstrated to the medical world what Oliver Wendell Holmes later described as a "priceless gift to humanity."[2]

Despite the obvious and revolutionary importance of anesthesia, it is a curious commentary on human nature that for many decades after its introduction to medical practice the administration of anesthesia was relegated to the youngest, the most inexperienced, and least expert member of the surgical staff or, in many cases, to the patient's general practitioner. Indeed, surgeons came to look with disdain upon the carrying out of anesthesia and even refused to interest themselves in any of the intricacies of the practice. Nurse technicians were then trained for the administration of anesthesia. To the great credit of these nurses, it must be stated that, although their position was often unenviable, their services were infinitely more satisfactory than those of the occasional anesthetist, including the family doctor so often pressed into service against his will. Thus the development of the nurse anesthetist remedied a bad situation and successfully bridged an important period in the history of anesthesia. They carried on to a time when it finally became appreciated that more than simple technical excellence is required of the anesthetist.

It is now of course well understood that the progress and development of surgery and anesthesia are closely interdependent. One wonders how much more rapidly anesthesia and thus surgery would have progressed had anesthesia earlier aroused the interest of surgeons and others able to understand its basic scientific problems and needs. However, it should be noted that the tardy development of anesthesiology as a specialty was not due to absence of an early start. John Snow, who was licensed as a member of the Royal College of Surgeons in 1838 and who received his M.D. from the University of London in 1844, specialized in anesthesia as soon as the news came from America in 1846, and served as anesthesiologist thereafter at St. George's Hospital in London, making several contributions to the methods then in use.[3]

The development and synthesis of anesthetic drugs is largely a problem for the chemist. The action of such agents in the living organism can then be studied by the physiologist and the pharmacologist. Such information, however, is inadequate for the full and correct clinical application of anesthesia to the human being. For this it is necessary to provide trained personnel who have knowledge of the basic sciences as well as a clinical appreciation of, and experience with, human disease. This combination exists in physicians who have become interested in, and have made a specialty of, this branch of medicine. Such a specialist, together with a surgeon, both graduates in medicine and of comparable training and intellectual capacity, can by joint efforts best subserve the needs of the patient. What they have to offer the patient is really complementary. Moreover, many of the answers to unsolved problems in surgery and anesthesia will be more rapidly forthcoming by an increasingly close relationship between well-trained surgeons and specialists in the science of anesthesia, which is often referred to as anesthesiology.

The objectives of anesthesia are three. The first is the prevention of pain. The second is the production of optimal operative conditions, including muscular relaxation when indicated while maintaining the welfare of the patient. The third is the preservation of vital function which may be interfered with in certain operative procedures, such as intrapleural manipulation. In the last named, adequate anesthesia makes the performance of thoracic surgery possible by providing the patient with pain relief while sustaining a satisfactory cardiorespiratory function. In achieving these goals anesthesia carries with it definite hazards. In general anesthesia, pain relief is readily attained at a relatively safe depth of anesthesia. The potent drugs employed are useful anesthetic agents because they abolish reflexes and depress vital functions in a definite sequence, and respiratory function and circulation are impaired or abolished only when the dose of the drug is excessive. Moreover, with safe agents the passage from one depressed reflex to another is relatively slow and readily reversible. For example, satisfactory general anesthesia for abdominal operations is dependent upon rather profound muscular paralysis which requires the blocking of certain deep reflexes. Such an effect may be obtained by the use of the more potent anesthetic agents alone or by the use of weaker agents plus curare or its derivatives given intravenously.[4]

While the objective of ideal operative conditions often necessitates muscular depression and sometimes paralysis of the muscles of respiration, it is the role of anesthesia to provide these operative conditions only to a degree consistent with the patient's welfare. Both general and spinal anesthesia are effective in this respect, each producing pain relief and satisfactory abdominal relaxation, but with upper abdominal or general anesthesia carried to the third or fourth plane, the danger of unduly depressing respiration is always present. To achieve the requirements just mentioned the anesthetist must be fully conversant with the pharmacologic action of the agents he uses.[5]

The anesthetist must also be familiar with the physical diagnosis and pathology, basic knowledge of which can readily be applied to whatever untoward

reaction may develop during the course of the operative procedure. These reactions may be manifestations of the patient's disease. Familiarity with each disturbance and its etiology will enable the anesthetist promptly to institute the indicated treatment. He must be able to distinguish the circulatory and respiratory effects of posture, of trauma, and of hemorrhage from the systemic effects of the anesthetic agent. Thus it is fundamental that the anesthetist be well grounded in both surgery and medicine. This knowledge must be accompanied by technical proficiency in the actual administration of anesthesia. No matter how well indicated an anesthetic drug or method may be, it should not be used unless it can be expertly employed. Indeed, the excellence of the anesthetist is far more important than that of the agent or method chosen.

There is no question that certain anesthetic drugs or methods are in themselves responsible for morbidity which is difficult if not impossible to evaluate satisfactorily. For most operative procedures a good result is more dependent upon how the anesthesia is administered than on what anesthetic is adopted. This should not be taken to mean that an anesthetist should perfect himself only in the administration of a single agent. A well-trained and experienced anesthetist should be expert and entirely at ease with any type of anesthesia so that the proficiency which comes with practice may be applied to whatever method or anesthetic agent is indicated for each particular patient. The entire question of the training of anesthesiologists has in no small measure been made difficult and confusing by prejudices on both sides, those wholeheartedly in favor of and those unsympathetic with the anesthesiologist. This is but a natural event. It has occurred with the development of every new field and has in all probability certain value in preventing too rapid progress and at the same time promoting a desirable zeal on the part of those who are interested in advancing this specialty. Many of the prejudices within the group of anesthesiologists and without this group have now been largely overcome. It can be said with reasonable assurance that almost everyone today accepts the desirability of the anesthesiologist. It is true that many objections are still raised in the terms of management difficulties, but hardly anyone today would be willing to say that the services of a thoroughly experienced and soundly trained anesthetist for a patient requiring an operation of major magnitude and of doubtful risk would not be preferable to any other type of anesthetist.

Many of the difficulties and conflicts about the anesthetist undoubtedly have been prompted by the overenthusiastic anesthesiologist who would literally change things overnight, not only an impractical viewpoint but one incapable of attainment. Hardly anyone would fail to agree that it will take years of gradual and evolutionary development in the field of anesthesia to train and make available the number of anesthesiologists necessary to meet the demand. Real progress, however, has been made and there are few places today where, even though anesthetists are not available in sufficient numbers, there is not an attitude that it would be desirable, if possible, to have them. Such are the developments in surgery that even the most prejudiced advocate of the continuation of nonprofessional anesthesia would agree that some of the newest surgical procedures developed in recent years would not have been possible without the aid of specially trained physician-anesthetists.

Experience makes one vividly aware of the extensive changes which have taken place in the way of widening the field of surgical approach to hitherto unapproachable regions, in the field of application of extensive surgical procedures to bad risk patients, and in the field of elderly patients who in the past were denied many operations which can now be applied. It was said that no patient over 60 years of age should have an abdominal-sacral removal of a cancer of the rectum, but, because of his age and the serious character of the risk, should have only the local posterior approach. As a result, not only because of improved surgical measures and surgical technics, but in a very large measure because of the anesthesiologist's aid in producing anesthesia and supporting these patients, it is now possible to do this operation in the age group between 80 and 88.

In evaluation of this situation one has to consider how the anesthesiologist can aid the surgeon to visualize the benefits which react not only to the surgery but to the surgeon by having an anesthesiologist. One has to consider the distractions of the surgeon's attention which resulted in days gone by when his responsibility involved not only the operation itself but also the anesthesia and the patient's general condition. The unwillingness of many surgeons in the past to relinquish these unnecessary responsibilities and to delegate them to the anesthesiologist was a cause of some of the obstructions to the development of the physician-anesthetist, and this condition still exists in some quarters.

Through the years one is conscious of the benefits which can be obtained by the complete divorcing of the surgeon's attention from the maintenance of relaxation and responsibility for the patient's general care. I am extremely conscious of how much more easily I can concentrate on some of the difficult technical details in operation since the anesthetist has assumed the above-mentioned responsibilities. In addition to this, one has only to think of the necessity for complete relaxation, wide exposures, dry fields, and good light to realize their importance in making modern surgery technically possible.

I feel very sure that anesthesiologists, by means of their endotracheal tubes providing free airways and producing cadaveric quietness of the neck, with absence of pulmonary congestion and excessive bleeding in the operative field, have contributed much to the excellent results which have been obtained by many in the field of thyroid surgery. I am certain, as I have watched the progress in the fields of neurosurgery, thoracic surgery, intracranial surgery, and intraspinal surgery, that the relaxation, the maintenance of favorable operative conditions, and the ability to maintain anesthesia without too much disturbance of the patient's physiologic state, even when placed in almost impossible positions, are in a large measure due to the advances in anesthesia. Many of the thoracic, cardiovascular, and pulmonary problems have in no small part been greatly aided by improvement not only of anesthetic methods but of the anesthetist.

Not only have anesthesiologists increased the accomplishments of surgery, but they have aided the surgeon himself. I can recall how much the more serious surgical operations used to take out of the surgeon than they do today, although today's operations are often more extensive than those of the past. The good relaxation and the complete freedom from apprehension on the part of the surgeon about the patient's

general condition are responsible. I know of nothing in a surgeon's life which is so emotionally upsetting and nervously exhausting as to be faced with the responsibility for a human life when he is constantly aware of a patient's rapidly failing condition and an impending table death. I doubt if there exists a surgeon who is so hardened as not to have been upset by the need to complete a surgical procedure on a patient when he was conscious of the possibility or probability of a table fatality.

Surgeons are often thought of as courageous persons, and it is true that a brave exterior is usually presented. However, underneath the calm surface I am sure that there often resides a badly troubled conscience and a wish that some one was at hand to help him in supporting the patient and to share the responsibility. If these statements seem dramatic they are presented only with a desire to reveal the psychologic benefit to the surgeon of being able to shunt some responsibility on the control of conditions during operation onto the infinitely more competent shoulders of the anesthetist.

In comparing one's own experiences with major procedures today with those of years gone by when the anesthetist's responsibility was almost solely that of maintaining a painless sleep for the patient, certain facts come to mind. It was common in the past for patients having major surgical procedures to leave the operating table cold, blue, wet and in surgical shock. Efforts to combat this state often were not undertaken until the changes had become irreversible. Practically no patient today, no matter how extensive the procedure, leaves the operating table in such a state. Instead even after operative procedures lasting 3, 4, and 5 hours, they leave the table warm, pink, and dry. Such is the ability of the anesthesiologist, charged as he is with the patient's general condition, to maintain it by drugs, fluid, blood, and position, that rarely does irreversible shock occur.

In support of the training of a greater number of physician-anesthetists, one has to think only of the increasing variety of agents yearly becoming available in anesthesia and the ever widening burden of responsibility which is being placed upon the shoulders of the anesthetist. Recently results of the treatment of cardiac arrest on the operating table have been published. In one clinic seven of fifteen patients have had their heart action successfully restored and in sufficient time to retain a clear and normal mentality.[6] Here is an excellent example of real need for an anesthesiologist because upon his shoulders rests the responsibility in most cases for the discovery and diagnosis of the cardiac arrest early enough that there is sufficient time to restore heart action before cerebral damage has taken place.

The developments in surgery and anesthesia fields are such that it is impossible for the surgeon to keep himself completely informed in both fields. To realize this one has only to think of the matter of transfusions and the need for some one who has the interest and experience to be responsible for proper blood grouping, cross matching, the avoidance of mismatched blood, and the prompt management of the complications of mismatched blood should they occur; one has to think only of the almost complete elimination of postoperative pneumonia since the responsibility for the technical management and relief of pulmonary atelectasis by suction bronchoscopy and endotracheal aspiration has been placed in the hands of the anesthetist.

Anesthesia is a practical subject and anesthesiologists cannot be trained in a laboratory. It is a field in which practical experience must be had with actual patients even to a greater degree, if possible, than in surgery itself. And so the training of an anesthetist will always be the responsibility of already trained anesthesiologists. It is for that reason that it is my firm belief, particularly because of the inadequate number of anesthetists now available, that it is the serious responsibility of every anesthesiologist to conduct a training program to the limit of his capacity. This program should provide instruction by lectures and by selected reading, but particularly the actual opportunity under trained and experienced anesthetists for the student anesthetist to become expert in all of the branches of anesthesia.

The place of the anesthetist in the surgical team from the point of view of responsibility is an important one. No anesthetist will function successfully when the attitude of the surgeon is that the anesthetist is a necessary but undesirable adjunct. When the attitude of the surgeon is not that of placing the ability and the opinion of that anesthetist on the same level with his own, the anesthetist's value will be seriously compromised. If the attitude of the surgeon, when a difficult operation of great surgical magnitude is successfully completed, is not that a good part of the success of the operation is attributable to the anesthetist and his methods, the anesthetist's value will again be compromised.

While observing the relationship to patients, I have been made very conscious of how necessary it is for the anesthesiologist to be kind, patient, and considerate. He is the one who visits the patient before operation. He is the one upon whom the patient depends for the protection from pain, and for emotional shielding during the operative procedure. It is he who must remember the night before operation that the patient is in a state of high-strung apprehension, sensitive to rude shock or rough approaches, and that no one, not even the surgeon, has a greater opportunity to establish relationships of trust and confidence than he does at that time.

Not only is it important, I believe, for the anesthesiologist to identify himself to the patient prior to operation, but it is of the greatest value, not only from the patient's point of view and comfort but from his own, for him to establish, if possible, relationships with the patient after operation. It not only permits him to be aware of postoperative complications, but also identifies him in the patient's mind, as it properly should, as the person who carried him so comfortably through an ordeal about which he had undoubtedly suffered considerable apprehension. This relationship establishes something that is important to every doctor —a rewarding gratitude on the patient's part. It also establishes his specialty branch in a position of deserved dignity.

The advances made in surgery in recent years have been equalled by those made in anesthesiology and there is little doubt that there is an interdependency in the progress of those two specialties. Many surgical procedures are now commonly performed which a few years ago would have been considered impossible because of inability to maintain anesthesia without too much disturbance of physiologic functions. The value of the anesthesiologist in the management of special problems in the operating room and in widening the

scope and decreasing the hazards of surgery, is almost universally accepted. His function in obtaining surgical relaxation, or his blame for lack of it, is well recognized by surgeons everywhere. The many important services which the anesthesiologist can render to patients outside of the operating room are not so well known. In fact, the valuable services which he can render in addition to the actual administration of the anesthetic, in the operating room are often unappreciated both by surgeons and by anesthesiologists.

It might be said that sometimes a sort of vicious circle has developed in the relation of anesthesiologists and surgeons in the care of patients. The anesthesiologist is prone to assume the attitude that he is in a technical position and is kept in such a position by the surgeon, and hence has no incentive to broaden the horizon of his field of service. The surgeon, on the other hand, sees that the anesthesiologist renders a technical service and oftentimes a very good one, but he sees little or no manifestation of any other interest in the care of the patient. Hence, he is often quite right in his assumption that the anesthesiologist is only a technician who is either incapable of assuming or unwilling to assume other responsibilities.

Anesthesiologists must recognize, and fortunately many of them are now recognizing, the fact that their acceptance on a full consultant basis depends on more than the attitude of the surgeon. They must accept the responsibility that the word consultant implies; this involves effort, thought, and time. It is easy to be a technician, to perfect oneself in the execution of a limited technical job without much thought of its relation to the entire problem. This allows more time for golf, but it does not carry with it the satisfaction and opportunities for service such as are afforded by willingness to prepare oneself to assume the responsibilities which are usually so readily given once proof of ability is established.

We might properly consider just what are some of these services, other than the conduct of a safe and satisfactory anesthesia, that the anesthetist is peculiarly fitted to render to surgical patients. We must not forget that the most important single attribute of an anesthesiologist is his ability to administer skillfully the proper anesthetic agent for the proposed operation. All his other attributes and responsibilities are but by-products of this function. The number one reason for his existence is his ability to so conduct the anesthesia that the surgical procedure can be performed with facility and with the greatest degree of safety to the patient.

In order to conduct this anesthesia properly, the anesthesiologist must not only be aware of the agents and methods that will cause the least physiologic disturbance to the patient, but also he must understand the problems and difficulties with which a surgeon has to contend. He must share with the surgeon the realization that their goal is the same. Appreciation of the surgeon's problem must go further than the immediate situation. It entails a fundamental knowledge of surgery sufficient to enable him to appreciate and to weigh properly the surgical risks and hazards as well as the ultimate aims to be accomplished by the operation.

The final criterion of all clinical work is not the proper selection of the anesthetic or the brilliant performance of the operation, but the postoperative condition of the patient. An appreciation of the surgical problems and weighing of the relative risks may sometimes result in selecting agents or methods which might be considered more hazardous than another usable agent or method. Yet by the increased facility with which the technical procedures can be accomplished, the over-all risk to the patient may be lessened.

For the sake of convenience we may consider the role of the anesthetist in the care of surgical patients under three heads: Preoperative, operative, and postoperative. Every surgical patient should be seen by an anesthesiologist prior to operation. This visit involves a great deal more than just a routine order for preoperative medication, and perhaps obtaining of the patient's home address for the purpose of billing. The anesthesiologist should make a real evaluation of the patient's surgical and anesthetic risk. He should carefully review the history and physical findings for the factors which may adversely affect the anesthetic or surgical course, after which time he should personally interview the patient. This preanesthetic interview is of inestimable value in allaying the patient's fear and in convincing him that he can be carried safely and comfortably through the operative procedure and that he need not anticipate pain or discomfort to any degree or psychic apprehension postoperatively.

Although the surgeon and the anesthesiologist share responsibility for the success of the surgical procedure, in certain aspects the responsibility of the anesthesiologist should be individual. Ideally this should be true with reference to the selection of the anesthetic agent and method. This presupposes that the anesthesiologist is sufficiently aware of the surgeon's problem and has sufficient general medical background to evaluate properly the physical state of the patient. Only with due consideration of the surgeon, the anesthetic risk, and appreciation of the ultimate goal toward which the entire treatment is directed, is the anesthetist in a position to represent the final authority in the selection of anesthetic agents and methods.

A large proportion of the service rendered by the anesthesiologist during the course of surgery is the supportive treatment. Maintenance of as nearly normal physiology as possible can well be carried into the early postoperative field. The anesthesiologist's familiarity with treatment of all types of circulatory and respiratory depressions can be of real value in the management of postoperative shock. As mentioned before, this implies a fundamental knowledge of fluid therapy. The anesthesiologist's familiarity with the patient's reaction to the preanesthetic medication, as well as with the state of his circulatory and respiratory systems following surgery, enables him to evaluate properly the amount of postoperative sedation.

The anesthesiologist is familiar with the handling of gases and with respiratory physiology. He is called upon to assume responsibility for inhalation therapy since his interest is already along those lines and may result in an improvement of this service. He is also called upon to treat various forms of drug depression almost daily in the operating room. This experience can be of value in the treatment of all types of drug depression outside of the operating room.

SUMMARY AND CONCLUSION

The anesthesiologist has won for himself a real place as a consultant. There is an increasing demand throughout the country for professional anesthesiologists. Their value in the operating room, in the main-

tenance of satisfactory working conditions for the surgeons, is well established. The broad field outside the actual administration of anesthetics in which anesthesiologists can be of real service is not yet so widely recognized.

A word of admonition to both anesthetist and surgeon might be in order. The anesthesiologist is a true consultant; that is to say that he rarely renders service except at the request of other physicians. No other specialty, with perhaps the exception of radiology, is so completely dependent for its existence upon the referral of work from colleagues. This relationship imposes certain limitations upon the individual who practices the specialty of anesthesiology; it also imposes well-defined obligations upon him. He must have a sound general knowledge of most branches of medicine, and he must know his own thoroughly and completely. He must not forget that he is a consultant who is called upon for a service, and he must not be too free with advice in other fields. He must recognize his limitations in fields outside his own and must always have the same respect for the opinion of those whose special interest and training are in other fields that he demands for his own. Furthermore, the anesthesiologist must not forget that his acceptance as a consultant implies an ability and a willingness to accept this role.

On the other hand, it could be said with equal emphasis to the surgeon that he should appreciate and understand the technical problems with which the anesthesiologist must deal. He must realize that if anesthesiology is to maintain its position as something more than a purely technical service, it must be allowed to expand, and that the anesthesiologist, once he has demonstrated his ability and willingness to accept the role as a consultant, must be treated as one.

The relationship between surgeons and anesthesiologists must be one of mutual professional confidence, understanding, frankness, honesty, and courtesy, with fair-mindedness on both sides.

514 Beacon St.

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Inhalation Anesthesia in Chest Surgery

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One of the chief problems in the early development of thoracic surgery was the danger of asphyxia or lung collapse upon opening the pleural cavity. Graham as late as 1918 maintained that the largest allowable opening in the chest was 5 x 10 cm. Sauerbruch, the father of thoracic surgery, had in 1904 introduced a reduced pressure cabinet, resembling somewhat the modern iron lung, to obtain a larger pleural opening without precipitating pulmonary collapse. This chamber, designed to preserve the negative pressure of the pleural cavity, enclosed completely the surgeon, his assistant, and the patient's body, with only the head of the patient remaining outside. Willie Meyer, at about the same time, developed a universal differential cabinet with which either positive or negative pressure could be employed. Macewen in 1906 found that the pleural cavity could be opened safely if the opening was made on the lower part of the chest, with the opening side down. Endotracheal insufflation, using a small catheter and at a pressure of about 20 mm. of mercury, which prevented lung collapse, was introduced by Elsburg in 1909. McKesson, in 1910, invented a machine which delivered gases at predetermined pressures. Endotracheal inhalation anesthesia, the beginning of modern procedures used in thoracic surgery, was initiated by Magill in 1920.[1]

In the 1930's, American surgeons,[2,3] and later Kirschner[4] in Germany, reported the opening of the chest without positive pressure in operations within the pleural cavity. Killian's[5] experiments indicated that shift of the mediastinal vessels, not collapse of the lung, caused death. If the disease process held the lung and mediastinum rigid, distress would not follow opening of the pleural cavity, but if the mediastinum acted as the flap, distress followed immediately upon opening. These facts were recorded by Murphy[6] in 1898, but their importance was overlooked.

The theories of the thoracic surgeons in regard to open pneumothorax operations received a profound shock during the years following 1930, when more and more major thoracotomies were performed under spinal analgesia. The patient usually breathed without distress and showed little or no cyanosis during prolonged lobectomies. It was obvious that a factor which produced disastrous results from mediastinal flutter was present under inhalation anesthesia and in an unanesthetized patient, but absent under spinal anesthesia.

Killian[5] demonstrated by animal experimentation a reflex mechanism arising from receptors in the lung and in the costal joints, which regulated the tone of respiratory muscles according to the momentary requirements of oxygen by the body. This reflex was particularly sensitive to deflation of the lung, providing vital respiratory excursions of the diaphragm and hypertonus of the intercostal muscles on both sides of the body when collapse occurred. Under spinal analgesia, however, the sensory side of this arc, which follows the intercostal nerve to the respiratory centers, was broken and the mechanism of adjustment did not

appear, so that quiet respirations persisted in spite of the pulmonary collapse. As a correlary to these facts it followed that much of the mediastinal movement under inhalation anesthesia was due to the violent respiratory excursions reflexly produced on the same and the contralateral side of the thorax by collapse of the lung. In addition when the reflex mechanism has been excited suboxygenation results from the violent but inefficient respiratory movements.

If thoracic surgery was to progress it was essential to find a method which would overcome this reflex and disturbance of respiration. The method of positive pressure anesthesia remained open to the anesthetist, for by keeping the lungs inflated it prevented the onset of violent respiratory movements and hypertonus of the respiratory muscles. However the main disadvantage of this method was that the lungs remained inflated, producing a circulatory shunt and a rise of the carbon dioxide tension of the arterial blood. Furthermore the inflated lungs sometimes interfered with the operating technic of the surgeon. Preoperative artificial pneumothorax was advocated by Overholt[7] for the purpose of accustoming the patient to reduced lung capacity. Other workers used substances such as talc in the pleural cavity to produce artificial pleural adhesions. This procedure was aimed at preventing the collapse of the upper lobes during lower lobectomies.

In thoracic surgical work at the Osteopathic Hospital of Philadelphia the following method of administering inhalation anesthesia is followed:

The patient comes to the operating room on a carrier and immediately is given an intravenous transfusion of saline. A syringe containing either 2.5 or 5 per cent Pentothal sodium solution is attached to the intravenous apparatus. After examination of the patient's orifice and determining which side of the chest is to be opened, the anesthetic is administered with the patient in a supine position. At this point, either direct vision or blind endotracheal intubation is effected by the following method.

With the direct vision approach, we use a Flagg laryngoscope and either a plastic catheter, a rubber catheter, or an interwoven catheter with varnish finish. In my cases I prefer to have the inflatable cuff attached to the endotracheal tubes. During direct intubation an anesthesia jelly is used on the catheter and as it is being inserted we place the cuff about ½ inch below the vocal cords. If the operator does not choose to use the inflatable cuff, the largest size catheter than can be used with comfort is inserted. This blocks off as much of the tracheal air as possible, and allows only a minimum amount of air to escape by way of the cords.

The laryngoscope is withdrawn and the endotracheal tube projects into the conventional mask which is placed over the mouth and nose, and the patient is prepared for operation. If at any time during this procedure the patient becomes active, a small additional amount of Pentothal sodium is added to the continuous drip intravenous solution until the patient is taken down to the desired level of quietness.

At this point the patient is transferred to the main operating table and placed in a more or less kidney position, with the diseased side uppermost. The position of the patient is of the utmost importance inasmuch as we do not use the conventional thoracic surgical table, but the conventional operating table. For example, if the left side is the diseased area the patient's left side will be uppermost. The right leg is bent back upon itself and a pillow placed upon it, and the left leg, or upper leg, will be held straight down along the table. The patient's hips are then strapped in this position with adhesive tape. The shoulders are brought back to the edge of the table with both arms free. The right or dependent arm is used for the intravenous saline and Pentothal sodium administration. This permits the left arm to be freely movable and readily placed in any position the surgeon desires, so that he may have the proper room for operative procedures.

At this time the balloon of the endotracheal tube is inflated so that the trachea is completely sealed off and the system is airtight or closed. Now the inhalation anesthesia is begun using a combination of nitrous oxide, 90 per cent and oxygen, 10 per cent. Anesthesia is maintained as in any other conventional operation by the use of a machine enclosed system. The surgeon now begins the operation and the patient is kept on nitrous oxide-oxygen anesthesia until the entire chest wall has been incised down to the pleural cavity. This permits the surgeon the use of a diathermy apparatus, a Bovie machine or a Cauterodyne, or any other electrosurgical unit he may desire, to seal off the bleeding points in the superficial chest wall. At this point, when the surgeon is ready to perform the surgical pneumothorax, ether is added to the anesthesia.

As the pneumothorax is completed, the anesthetist immediately maintains respiration by manual force or manipulation of the bag so that the lung will not collapse completely. As the operative procedure progresses the lung is greatly decompressed, to give the operator access to the entire field and a clear view of the operative area. If the operation is to be continued for a long period, then the surgeon interrupts the procedure about every 20 minutes so that the lung can be reinflated to prevent atelectasis on the affected side. The lung is inflated with oxygen and helium and maintained for 2 or 3 minutes until it protrudes from the wound or the operative field. The lung is then allowed to collapse and the operation continues. When the operative procedure is pneumonectomy, complete removal of the lung, this procedure is omitted inasmuch as it is not necessary to keep lung tissue alive that is going to be removed.

The ether-oxygen anesthesia is continued throughout the procedure until the surgeon is ready to close the incision. At this point the nitrous oxide-oxygen combination is again used to permit the patient to emerge as much as possible, so that by the time the skin sutures are being applied he may even be moving slightly. This is desirable because the endotracheal equipment and airways must be removed as quickly as possible, so that the patient does not develop edema of the trachea necessitating tracheotomy.

The patient is then returned to his room, with the endotracheal tube still in place, but the cuff deflated to take pressure off the trachea. Aspiration is performed every 15 minutes postoperatively to prevent secretions from forming or collecting in the trachea to cause respiratory embarrassment of either lung.

There are many and various technics for maintaining positive pressure during thoracic surgery. The current trend in new equipment is aimed at abolishing

the manual manipulation of the bag by the anesthetist and toward depending solely upon the pressure mechanism and reactions of the lung.

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Low-Dose Spinal Anesthesia for Cesarean Section

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INTRODUCTION

"What anesthetic are you going to give me, doctor?"

Such a question has been asked of each of you who are vitally interested in anesthesiology. And how did you respond to the question? Were you limited in your choice of anesthesia because of lack of application on your part, lack of ability to perform various technics, ebbing confidence in yourself, geographic factors influencing choice, or possibly the surgeon's viewpoint?

Why do you choose a particular anesthetic technic or procedure? Is it because you were trained along a particular line of reasoning, many times peculiar to a certain area of the country? Or is it because you have failed to advance yourself through postgraduate education, periodicals, and new books?

The next time an obstetric patient asks "What anesthetic are you going to give me?" it is your duty as an anesthesiologist to be able to answer that you will administer the very best agent by the procedure designed to give the greatest margin of safety. It should be pleasant to the patient and meet the requirements for the conduct of the surgery. Operation should be completed as rapidly as possible so that the infant will be subjected to the least amount of anesthetic agent and its toxic properties.

At the Art Centre Hospital members of the Department of Anesthesiology gave some 175 low-dose spinal anesthesias for cesarean section from December, 1946, to August, 1951. An almost equal number of anesthesias for cesarean section were divided between inhalation of cyclopropane, and epidural and continuous caudal conduction blocks. In this study we will confine our attention to the series of low-dose spinal blocks.

PREOPERATIVE CONSIDERATIONS

Patients receiving block anesthesia for cesarean section are given Delvinal sodium, 1½ grains orally, 90 minutes before surgery, and scopolamine, 1/200 grain 45 minutes before surgery is scheduled to begin. Careful evaluation of the blood pressure, red blood-cell count, and hemoglobin is imperative. Extremes in blood pressure contraindicate spinal anesthesia. A hemoglobin finding of 80 per cent or 11.5 gm. and a red blood-cell count of 3,750,000 are necessary before we consider spinal block for cesarean section. Very often one's anesthetic judgment must be relied upon when laboratory findings are not in accord with the patient's physical condition. Anemia in any of its forms is adequate reason for rejecting spinal anesthesia in favor of other technics.

At times patients are mildly opposed to spinal anesthesia of any kind. If we feel that, because of existing conditions, the life of the fetus may depend on use of spinal technic, we attempt to guide the patient so that she voluntarily gives permission for its administration. Resuscitation of an infant with respiratory embarrassment is often a difficult procedure, and to give the newborn fetus every aid during the first minutes and days of life, a conduction block is very often the anesthetic of choice, but spinal anesthesia is never forced upon anyone.

Very often the cause for greatest fear is the thought of being awake and hearing conversation and the sounds of an operating room. This fear is easily allayed by promising the patient that she will be put to sleep before surgery begins.

We have found low-dose spinal anesthesia an excellent choice for cesarean section in many cases, but at no time are the other methods of anesthetization neglected, nor is the patient fitted into the spinal anesthesia pattern. Continuous caudal, lumbar epidural, local infiltration with inhalation supplement, and cyclopropane are all methods worthy of consideration.

SPINAL ANESTHESIA

As formerly administered, spinal anesthesia in obstetrics was a very dangerous procedure and was responsible for many maternal deaths.[1] Now it appears as if the fatalities were due to overdosage. It took some years of observation and many fatalities before the general opinion was formed that the gravid patient is especially receptive and vulnerable to the effects of spinal anesthesia. Gradually it evolved that the usually effective dosage for the pregnant woman was one-half or less the usual dose for the nongravid woman. Safety for the mother and for the child has been increased greatly. As a result spinal anesthesia in obstetrics has gained tremendously in popularity, until today, it is practiced in some places to the exclusion of other methods. Certainly, it is ideal for the infant, reducing fetal asphyxia to a minimum.

Vascular collapse or obstetric shock has a reported incidence of 2.6 to 7.7 per cent. The exact cause is unknown but Dieckmann[2] believes the fault lies in some nervous instability as a result of which blood

collects in the mesenteric capillaries. The possible occurrence of such cases indicates the need for careful determination of the blood pressure immediately before injection of a spinal anesthetic, for the accompanying spinal anesthesia superimposed upon an already existing circulatory depression constitutes a grave danger. These patients usually respond to vasopressor drugs and oxygen administration; endotracheal intubation should be available. We have observed three cases of vascular collapse in 175 cases of cesarean section in which the blood pressure has fallen below 40 mm. of mercury.

The importance of careful supervision of blood pressure, pulse, and respiration cannot be too strongly emphasized. The blood pressure should be determined before the anesthetic agent is injected and repeated every 2 to 5 minutes, and a record should be kept so that changes may be readily noticed. Vasopressor substances should be used before the block is performed, and certainly subsequent doses of analeptics should be administered during surgery if necessary to support blood pressure, blood volume, and prevent fetal hypoxia.

Using the blood pressure at admission as a normal, we have found that the systolic pressure drops an average of 35 mm. of mercury and the diastolic drops 20 mm. Considering the effects of premedication on blood pressure, this is minimal. As a rule, little additional vasopressor medication is needed before the birth of the baby as the pulse remains of very good quality, and as soon as the infant is delivered, the blood pressure assumes the preoperative level. Additional vasopressor medication was deemed necessary in 35 cases (20 per cent).

At the Art Centre Hospital the anesthesiologists are indeed fortunate in having rapid surgeons. The average time from the incision to the birth of the infant is 2 minutes and 10 seconds. We can almost routinely expect the infant to be born in 2 minutes or less. It is here that the value of teamwork is demonstrated. Rapid, sure surgery, with a minimum of lost motion on the part of the surgeon is paramount in obstetrics. To this "anesthesiology is adding its mite in the saving of infants' lives."[3]

The anesthesia produced by the spinal route occasionally is not totally effective. We have found this to be no great disadvantage as it can readily be supplemented with minimal cyclopropane, or a Pentothal drip of 0.2 per cent dilution. During the past year and a half we have been starting a continuous drip solution or Pentothal Sodium, 0.2 per cent, at the rate of 30 drops per minute just before the surgery begins. This quiets the patient but does not put her to sleep. It also aids in stabilizing blood pressure. Following the birth of the infant, the drip is either discontinued for the stable patient or increased to about 90 drops a minute. On increasing the dose of Pentothal, the patient sleeps through the remainder of the surgery but is usually awake when she leaves the operating room.

When the patient is brought to the operating room, the pulse is checked and she assumes the right lateral position. If the pulse is 80 or less, ephedrine, ¾ grain, is administered. If the pulse is 80 to 90, Methedrine, 20 mg., is given, and if the pulse is above 90, Neo-Synephrine, ¼ cc. (1 per cent), is used. This schedule for analeptic drug is proving very effective for us.

The circulatory effects[4] of pressor drugs have been subjected to much careful analysis. These substances can be divided into two broad categories. The first, which includes epinephrine, Methedrine, and ephedrine, is characterized by an action on the heart resulting in an increased stroke volume and heart rate and cortical stimulation. There is at the same time a diminution in total peripheral resistance indicating vasodilation somewhere. The second group, in which belong Neo-Synephrine and Methoxamine, causes little or no increase of cardiac output but a distinct rise in total peripheral resistance. This apparent constrictor action appears to be exerted on both the arterial and venous systems. In the majority of instances, the pulse rate is slowed following the administration of these drugs. This is a very different type of pressor activity from that which has been described for epinephrine and ephedrine.

TECHNIC

Under aseptic precautions, the initial skin wheal is made with Monocaine, between the third and fourth lumbar spinal interspace. Very infrequently is the second and third lumbar interspace chosen, and then because of anatomic variations, obesity, scoliosis, or lordosis. A 22 gauge B-D spinal needle is used for the entrance into the subarachnoid space. With the needle in this interspace, the drug will reach to a level of sensory anesthesia, just above the umbilicus and will produce the desired level of anesthesia with a minimal amount of anesthetic agent.

Two cc. of spinal fluid are withdrawn and 100 mg. of Monocaine are dissolved. Using the calibrations on the standard 2 or 3 cc. syringe, each line is equivalent to 10 mg. of Monocaine. Therefore, two cc. equals 100 mg. of Monocaine, and 1 cc. contains 50 mg. of Monocaine. Each unit of measurement beyond that reduces dosage by another 10 mg. of Monocaine. Usually less than 1 cc. of this solution (or less than 50 mg.) is injected intrathecally. The patient is then turned on her back and placed in no more than a 5 degree Trendelenburg position; often the table remains level. The site of injection, spinal curve, dose, rate of injection, and amount of barbotage are factors determining degree of Trendelenburg. During the time required for the block to become established, the abdominal field is prepared and draped.

The blood pressure, pulse, color, and respiration are determined every 5 minutes or oftener if necessary. Additional vasopressor substance is given either intravenously or intramuscularly, as the condition dictates. Oxygen is administered throughout the procedure.

It might be of interest to know that in this group of 175 patients, the anesthetic was administered by eight different individuals, three of whom are certified in anesthesiology, and the remaining five residents in training. There is a standard technic and it is closely followed by all. Residents in training tend to use a slightly larger dose than their more experienced associates.

In the series of 175 cases of cesarean section performed by surgeons at the Art Centre Hospital, the average total dose was 38 mg. of Monocaine. The greatest amount of Monocaine used in this group was 80 mg. In this case a large ventral hernia was repaired in a woman weighing some 250 pounds; a viable infant was extracted before the repair. The smallest dose of Monocaine used was 15 mg.

The surgery in the majority of these cases was done by one member of the obstetrical department and three members of the surgical department. The average operating time for cesarean sections is 32 minutes.

POSTOPERATIVE FOLLOWUP

Determining the actual effective duration of spinal block anesthesia for section is rather difficult. Some 10 minutes elapse from the time the block is given and the surgical field is prepared until the patient is ready for the incision. To this must be added the time necessary for closure of the skin. Therefore one must maintain an adequate level of analgesia for a hypothetical minimum of 20 minutes over and above the actual operating time.

The cooperation of patients and nurses was engaged to help arrive at the most nearly accurate figure possible for the duration of analgesia. Both nurses and patients were instructed in what we were attempting to find. The patient was asked to call the nurse when the upper portion of the incision began to bother her, and the nurse was asked to respond immediately and pinch a skin area lateral to the uppermost part of the incision to test sensitivity. With this sort of help we have been able to determine fairly accurately the average duration of analgesia in cesarean section when minimal dosage spinal anesthesia is used. This duration has been found to be approximately 57 minutes when an average of 38 mg. of Monocaine is used.

There have been no complete failures in our series. Inadequate level of anesthesia or discomfort to the patient to the point of being objectionable has been present in 18 cases. This was readily relieved by a continuous drip of 0.2 per cent Pentothal Sodium or by cyclopropane. Supplementing a block need never be embarrassing unless the anesthetist frequently fails in obtaining a good spinal puncture and injects the anesthetic solution with the hope that it will work. It rarely does.

In the training of residents in anesthesiology, one must constantly strive for a relatively simple technic, easily mastered; a minimum of pitfalls for the novice; and a high degree of safety for the patient, the unborn infant, and the young anesthesiologist. I do not favor experimentation in any form by first year residents in anesthesiology. Their main objective during the training period is to become firmly grounded in the basic technic and procedures of anesthesiology. They should acquire a very workable knowledge of the physiology, anatomy, and chemistry governing the anesthetic procedure. It seems imperative to me for the young anesthesiologist to become well acquainted with the action of a minimal number of anesthetic drugs and to be their master, rather than have a scanty grasp of all of the drugs associated with anesthesia and be their slave.

During subsequent years of training and experience the anesthesiologist should explore fully the numerous agents for anesthesia and their properties and use. By the time of certification, he should be the complete master of the situation and be competent to use any accepted drug in the conduct of anesthesia.

During the early period of this series of cases, we did not give intravenous fluids except when indicated. Later we began an infusion on all cases and believe that the peace of mind that accompanies an infusion and an open vein is priceless. Thirty-five cases developed sufficient hypotension to necessitate additional vasopressor medication. There seemed to be no difference in incidence of hypotension whether or not administration of a vasopressor substance had preceded the block. Three patients were given whole blood during surgery because it was felt that spinal block gave the patient and the infant the best possible chance for survival, even though hemoglobin level and erythrocyte count contraindicated its use. We prefer to transfuse on the table during surgery rather than preceding surgery.

Postoperative distention is almost nonexistent at Art Centre Hospital. Approximately 6 to 8 hours following surgery, the patient is ambulated, many times directly to the bathroom where she is able to urinate in many instances. Upon returning to bed she feels better because of the early activity. Postoperative catheterization, Wangensteen drainage, and Levin tubes are resorted to infrequently.

Postspinal cephalgia was recorded in seven instances. Four of these were extremely severe and were not readily controlled. As a rule these cases respond to a fractional caudal injection of normal saline, or to an ergotrate and caffeine combination available commercially. Absolute bed rest is often the best treatment for persistent postspinal cephalgias.

There were no neurologic complications in our series of cases although there are reports in the literature of nervous system complications. Lull and Ullery[5] state that they believe that if the technic of fractional or single dose spinal anesthesia is meticulously carried out, complications will be reduced to a minimum. They feel very strongly that the use of these technics should not be condemned because complications occasionally occur.

In our series 3 infants were stillborn and 3 deaths occurred in the neonatal period—from 9 hours to 5 days postoperatively. None of the deaths was attributable to the anesthesia. Four infants required endotracheal intubation for resuscitation.

There was 1 maternal death in this group. A huge ventral hernia was repaired immediately after delivery of the infant. The conduct of the anesthesia was uneventful. The patient resisted and rejected all types of postoperative treatment because of religious scruples. Death due to chronic myocarditis and uncontrollable shock occurred on the fourth postoperative day.

THE NEWBORN FACTOR

An infant may not show evidence of central depression until it becomes necessary for it to respire actively. Babies born of mothers who receive considerable sedation and an inhalation anesthetic during labor frequently have more trouble maintaining a clear airway and more often require resuscitation than do babies born of mothers who receive a block anesthesia. The possibility of greater infant salvage is the desired end result.

Study of statistics is an important part of the conduct of our specialty and those associated with it. Such a study never fails to indicate that there is need for improvement. On occasion it is reassuring to find that the statistics of others are very similar to ours. Taken as a whole, statistics emphasize the necessity of careful evaluation of the risk for the infant, as well as for the mother, in undertaking a cesarean section.

Critical analysis of a series of cases will uncover erroneous conclusions about the safety of section.

Watts and his associates[6] present a very interesting review of the oxygen of the arterial blood in the newborn. The following are excerpts from their monumental study.

Anoxia in newborn infants is thought to be dependent on the factors of prematurity, the trauma of labor, and the analgesia or anesthetic agents used. Much of the controversy regarding anoxia has concerned this latter factor. While it seems well accepted that use of excessive amounts of analgesia or anesthetic agents will be harmful to the newborn child especially if prolonged, it is controversial whether their moderate use is harmful. Henderson, Foster, and Eno have concluded that causes other than analgesic and anesthetic agents were found in over two-thirds of their clinically asphyxiated newborn infants.

As pointed out by Lull and Hingson, an adequate supply of oxygen to the intrauterine fetus is dependent on the following physiological factors: there must be an adequate oxygen level of the maternal blood, there must be sufficient relaxation of the uterine musculature to permit placental filling, the placental attachment must be sufficient, circulation through the umbilical cord must be free, and there must be normal maternal blood pressure. . . .infant oxygenation is not seriously lowered if the mother is given short ether or chloroform anesthesia, but when nitrous oxide-oxygen mixtures are used, there is some degree of anoxia, moderate in the mother and marked in the infant, which parallels the concentration of the anesthetic gases used. When cyclopropane is used as the anesthetic agent, the maternal blood has a pronounced elevation of both arterial and venous oxygen levels, but in the blood of the newborn there is less oxygen than in those infants born under ether anesthesia. However, while ether anesthesia for the mother appears to give the most favorable results in the infant, we must recall that . . . if the ether anesthetic is maintained for any length of time, a grave apnea is produced, perhaps owing to the increased amounts of ether found in the blood of the newborn.

When block anesthetics were used for the mother we had previously noted a much better respiratory response, better muscle tone and skin color in the infants as compared to those delivered under general anesthetics. . . .

From these findings we believe that . . . infants born of mothers under block anesthetics do not have better oxygenation than those born after ether anesthetics but they are not hampered by the depression which occurs with general anesthetic agents.

OUR IMMEDIATE FUTURE

The pointed remarks quoted above have answered many questions for me, and I hope for you. It means to me that our problems of anesthesia are just beginning. Education must be our motto!

First, we must start with ourselves. We must make ourselves competent. We must by means of study and practice, improve ourselves, make ourselves confident. We must see to it that we are worthy of our profession, our specialty, and our Society.

Second, we must education the surgeons. No longer is it acceptable that the surgeon go unchallenged. His is just a part of the over-all picture; this with other specialties, comprises the complete product. Anesthesiologists must demand that there be progress in surgical technic, ability, and knowledge as well as in their own. We must guide our surgeon associates so that they are constantly striving for a simplification of surgical technics with resultant decrease in operating time and concurrent decrease in anesthetic dosages and anesthetic time. We all know what this factor means to us in our work. We all know what effect dawdling surgery has on the fetus in utero.

Third, we must educate the patient concerning the value of a physician-anesthesiologist. We must tell them exactly what our specialty embraces. We must explain to them about inhalation therapy, diagnostic and therapeutic blocks, resuscitation, obstetric analgesia, and surgical anesthesia. We must let them know that anesthesia is no longer synonymous with ether by the open drop method.

Fourth, we must advance our specialty by acquainting the general practitioner with its value to him and to his patient.

Finally, we must make our presence felt in our hospitals by the superior grade of work we do and by the number of services we are able to offer beyond that of surgical anesthesia.

SUMMARY AND CONCLUSION

Cesarean section is a safe operation when performed under minimal dose spinal anesthesia. Maternal mortality approaches zero; infant mortality is higher than following vaginal delivery, but slightly lower than when block anesthesia is used. A careful review of 175 cesarean sections under minimal-dose spinal anesthesia was made in the hope of stimulating other anesthesiologists in the use of this accepted technic.

In most patients clinical experience continues to prove that untoward effects of all anesthetic agents tend to occur with increasing frequency with larger doses. Therefore, the judicious use of a small dose of an agent capable of producing the desired anesthesia and degree of relaxation increases the margin of safety.

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Inhalation Anesthesia in the Poor Risk Patient

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The term "poor risk" is used in this paper to refer to a patient after careful evaluation of his physical condition has shown a marked deviation from the normal in one or more of the body systems. In choosing an anesthetic agent for the poor risk patient one must consider carefully to what extent the agent or agents will affect the physiologic processes already impaired. It is difficult and impractical to attempt to lay down general rules governing the choice of anesthesia for these patients, inasmuch as each case presents an individual anesthesia problem.

The method of choice is the one which will produce the least harmful effects on the already impaired physiology and which at the same time will be adequate for the proposed operation. Should one's experience with the various agents and methods be limited, it is wise to select the agent and method with which one is most experienced. New agents and technics should not be used on critically ill patients merely because of a slightly increased margin of safety reported by some to follow their use. By proper anesthetic procedure skillfully carried out, preceded by careful preoperative preparation of the patient and accompanied by suitable supportive measures, the status of the poor risk can be improved from doubtful outcome to a reasonable chance for satisfactory convalescence and recovery.[1]

FACTORS IN POOR RISK

Too often much time is spent by the surgeon, internist, and anesthetist discussing irreversible conditions present in the patient, such as arteriosclerosis, hypertension, valvular and congenital heart disease, pulmonary fibrosis, emphysema, liver and kidney disease. At the same time reversible processes such as secondary anemia, hypoproteinemia, hypothrombinemia, dehydration, diabetes, and hypothyroidism are often neglected.[2] A few basic facts ascertained from physical examination and laboratory reports usually form an adequate basis for judging anesthetic and operative risk in a given case.

Blood count, hemoglobin estimation, blood protein, prothrombin time, blood pressure level, urinary findings, degree of cardiac and renal insufficiency, and general appearance of the patient in regard to nutrition, debility and weight loss must be considered. A more exhaustive examination of the patient may show further evidence of physiologic abnormalities, but such information may be not only unessential to the choice of the safest anesthetic agent but may even complicate the choice.

Some other ordinary factors which should be considered are:

Age.—Anesthesia and surgical intervention are not tolerated well by patients in the extremes of life. The respiratory system of infants and young children is easily depressed by anesthetic agents. Many of the aged are poor risk cases and do not react well to anesthesia. Debility and cardiovascular renal disease may be complicating factors in elderly patients. The mortality rate of surgery patients who are more than 60 years old is said to be many times as great as that for persons under 60.[3] Elderly patients recover more quickly after surgery if they are gotten out of bed at the earliest possible moment.

Habits.—Patients who use tobacco to excess and have an accompanying bronchitis are susceptible to postoperative respiratory complications. Chronic alcoholics often react poorly under anesthesia and also are susceptible to postoperative complications. The same may be said of drug addicts, who frequently suffer nutritional and nervous disturbances.

Nervous System.—High-strung patients are usually more difficult to anesthetize. Those who come to surgery worried and frightened do not present a good risk and frequently have a stormy convalescence. Adequate preoperative sedation and assurance are important therapeutic measures.

Debility.—Patients who are frail, debilitated, underweight, and poorly nourished lack the reserve of robust patients to withstand the toxicity of the anesthetic and the shock of operation. Even small doses of the anesthetic agent depress vital functions of these patients and care must be taken to prevent overdosage. Prolonged vomiting leads to nutritional disturbances, decrease of glycogen in the liver, and to the more serious condition of acidosis. The other extreme, alkalosis also is serious and sometimes is produced by intestinal obstruction.

Liver.—The liver and its functions have an important bearing on the choice of anesthesia. The normal functioning liver stands the strain imposed by anesthesia and operation remarkably well if its store of glycogen is adequate and anoxia is prevented. When function has been impaired by toxemia and nutritional disturbances have depleted the supply of glycogen, the liver not only functions poorly but is vulnerable to further damage from the anesthesia. The liver detoxifies some anesthetic agents while others inhibit its function and damage liver tissue. The most toxic anesthetic agent to the liver is chloroform. Vinethene also may damage hepatic tissue, especially if its use is prolonged. Ether impairs the function of the normal liver only slightly and normal function is soon restored during the postoperative period. Cyclopropane and the short-acting barbiturates have little if any harmful effect on liver function in the presence of adequate oxygen. Nitrous oxide is contraindicated when impaired liver function is present.

Renal Functions.—Ether anesthesia causes a marked decrease in the urinary output, but normal function usually is restored during the first 24 hours after operation. Cyclopropane also suppresses urinary output during anesthesia, but is followed by a compensatory increase in excretion following the operation. If renal damage is present at the time of operation, anesthetic agents which are toxic to renal tissue and inhibit renal function obviously will produce more serious disturbances in those organs than if they were normal.

Cardiovascular System.—Cardiac insufficiency, if advanced and uncompensated, presents one of the most serious complications the anesthetist faces. Cardiologists agree, however, that patients with many types of

cardiovascular lesions stand anesthesia unusually well, provided there is adequate compensation and cardiac reserve is satisfactory. Although careful cardiovascular examination should be routine before operation, especially in poor risk cases, a fair idea of a patient's cardiac reserve may be obtained by applying certain critical tests:

Moot's rule or formula provides an approximate index to the cardiac reserve. It is obtained by multiplying pulse pressure by 100 and dividing by the diastolic pressure. The answer is approximately 50 in the normal subject. For example: With a blood pressure of 120/80 the pulse pressure is 40. Multiply 40 by 100 and divide by 80, the diastolic pressure, and the result is 50 or 50 per cent. Patients showing an index between 40 and 60 per cent apparently have ample cardiac reserve. If the index is between 25 and 40, or between 60 and 75, the amount of cardiac reserve is low. If the index is below 25 or above 75, the case is probably inoperable, the cardiac reserve being too low.[4]

The simplest and probably the most reliable of surgical risk tests is the breath-holding test of Henderson. This is especially emphasized because it may not only indicate the degree of cardiac reserve but also may disclose such conditions as acidosis and respiratory or blood diseases. The test is performed after the patient has been lying down for 15 minutes or more. After observing several normal respirations, at the end of a normal expiration, hold the patient's nose shut and instruct him to keep his mouth closed and not to breathe until it is absolutely necessary. Normally one should be able to hold the breath for 25 to 30 seconds. Severe acidosis may be suspected when the breath-holding lasts only 5 to 10 seconds. Oxygen starvation which initiates even the slightest anoxemia or acidemia is dangerous in patients suffering from hemoglobinemia, shock, cardiorenal or pulmonary lesions, goiter or other disturbances of metabolism in which there is a tendency to acidemia. However, anesthesia tolerance must not be judged on one index or formula, but should be determined from all the information gained by the anesthetist.[4]

Where these tests are not made, it may be said that in general where no cardiac pain or dyspnea is present, either with or without moderate exertion, the heart will probably stand the strain of operation. The risk increases in proportion to the extent the patient's activities are curtailed by his cardiac condition. A survey of the literature indicates that patients suffering from angina pectoris, coronary occlusion, congestive failure, and syphilitic aortitis show a high rate of operative mortality.[5] Valvular heart disease and auricular fibrillation, if unaccompanied by failure and tachycardia, do not greatly increase the anesthetic or operative risk.[6]

Respiratory Systems.—Diseases of the lungs or respiratory passages have an important bearing on the course of anesthesia, possible complications, and the degree of risk for the patient, both during and after operation. There is also the added risk of other pulmonary complications as a result of the anesthesia and surgical procedure, or an extension of those conditions which existed before surgery. The closer the vital capacity approximates the tidal air the graver the risk. Lesions which affect vital capacity are emphysema, abscess of the lung, tuberculosis, pneumonia, pleurisy with effusion, asthma, and certain cardiac conditions, especially mitral stenosis. Reduction in vital capacity calls for particular care in maintaining adequate ventilation during anesthesia. Where there is any question about furnishing an adequate supply of oxygen an endotracheal tube with inflatable cuff should be introduced under direct vision. Five to 8 minutes of severe anoxia may produce severe and irreparable damage to the cerebral cortex.

When indicated, suction aspiration of the tracheobronchial tree during the immediate postoperative period is valuable for the control and prevention of postoperative pulmonary complications such as bronchopneumonia, atelectasis, and massive collapse of the lung. The administration of oxygen has become routine postoperative treatment, especially in poor risk cases, and is given by tent, nasal catheter, or special mask.

Diabetes—Most diabetic patients have been removed from the classification of poor risk patients by modern diabetic therapy and improved anesthesia. Unless these patients have another pathology which would itself increase the danger of anesthesia and operation, their prognosis is usually favorable. Associated pathologies prevalent in diabetics include tendency to coronary thrombosis and cerebrovascular accidents. Many clinicians maintain that the controlled diabetic can even withstand the effects of such agents as ether, but I am of the opinion that one is justified in using only those agents which interfere least with carbohydrate metabolism. Ether not only increases the blood sugar level but also has a tendency to produce acidosis as a result of postoperative vomiting and the restriction of food. Nitrous oxide and cyclopropane are suitable because they affect carbohydrate metabolism only slightly. Spinal and regional anesthesia also are satisfactory. Pentothal sodium alone or combined with local, regional, or inhalation anesthesia likewise may be employed for diabetic patients.

SELECTION OF AN ANESTHETIC AGENT

Wide differences of opinion exist among anesthesiologists as to the best anesthetic agent and method for the poor risk patient. In evaluating the available anesthetic agents it is quite obvious that the ideal anesthetic has not yet been found.

Ether.—Valuable as ether is in anesthesia practice, its use should be avoided as much as possible in poor risk cases, because of its irritating effects on the respiratory tract which predispose to postoperative pulmonary complications, and because of the vomiting, dehydration, acidosis, and the hepatic and renal dysfunction it causes. It is the safest of the inhalant gases that may be given by an inexperienced person. Ether, too, often will eliminate the arrhythmias caused by cyclopropane.

Cyclopropane.—The value of cyclopropane in many types of poor surgical risk cases is incontestable on the basis of its low toxic effect on liver and kidneys, anesthetic potency, and nonirritating effect on the respiratory system. It is indicated particularly for thoracic surgery, thyroidectomy, and for severely shocked and toxic patients. It is also indicated in chronic bronchitis, asthma, and respiratory obstruction. It is the opinion of many anesthesiologists that cyclopropane anesthesia, if not profound, is the agent of choice for the poor risk patient suffering from hemorrhagic shock. In asthma and respiratory obstruction 20 per cent helium can be added to advantage. Because the gas does not produce liver damage or kidney disease, it is useful in eclampsia. Cyclopropane also

can be used as an adjuvant to nitrous oxide-oxygen anesthesia if more relaxation is required.

Nitrous Oxide.—On the basis of its low toxicity nitrous oxide-oxygen anesthesia is safe, but the toxic effect of anoxemia which may occur is harmful to the poor risk patient. According to Gross and his coworkers,[6] the gas is not suitable for major procedures in cardiac patients since concentrations high enough to cause asphyxia are necessary. Asphyxia as a method of anesthesia is condemned, since it causes respiratory and cardiac depression, elevation of the blood pressure, and occasionally acidosis. When used with at least 25 per cent oxygen in cardiac patients, nitrous oxide produces rapid and smooth induction. It should not be used as a primary anesthetic in cardiac disease but is safe combined with ether, cyclopropane, basal narcosis, intravenous barbiturates, or curare for conduction, provided underlying hypoxia is not great. In advanced heart disease with hypoxia, even slight reduction in oxygen concentration may cause serious anoxia with resulting coronary or cerebral insufficiency.

Curare.—The employment of curare as a safe and useful drug was made possible by Richard Gill, who brought it out of the jungles of South America,[7] and by Harold Griffith,[8] who first used the curare derivative, Intocostrin in the clinical practice of anesthesiology as an important adjunct to inhalation anesthesia. It is not an anesthetic agent and is useful in anesthesia only because it produces adequate muscular relaxation. Use of curare permits employment of lower concentrations of more potent and toxic anesthetic agents and supplements the action of less potent and safer agents. Curare has no analgesic property, and when relief from pain is necessary, the appropriate agents and methods should be employed. Curare may be used with many of the inhalation agents, with Pentothal, with intrathecal technics if analgesia is present, and with regional and infiltration technics.

Curare is probably most often used with cyclopropane. When administered intravenously it provides muscular relaxation approaching that effected by spinal anesthesia with little circulatory depression, even in poor risk cases, provided the patient is well oxygenated at all times. Optimal doses of curare produce neither prolonged nor excessive respiratory depression when used with cyclopropane. With nitrous oxide anesthesia curare provides muscular relaxation not usually obtained by this gas alone. The controlled respiration assists in securing abdominal muscle relaxation and provides needed pulmonary ventilation, while the diaphragm and the intercostal muscles are partially or completely paralyzed by curare. During ether anesthesia, the dose of curare must be reduced to approximately one third of that used with cyclopropane. This is necessary as Cullen[7] found in a valuable experimental study, because ether itself has a curariform action at the myoneural junction; thus a patient under ether is already partly curarized. Sodium Pentothal does not have the curariform action of ether, but because of its depressing effect on respiration, particular care must be taken to maintain an adequate respiratory exchange when curare is added. Curare is a safe drug in the hands of persons experienced in the art and science of inhalation anesthesia. It is a dangerous drug when used to cover up errors of commission and omission in anesthesia technic.

Sodium Pentothal.—This method may be used in short, minor surgical procedures and for longer operations not requiring too much relaxation. It also may be used as an adjunct in cases where inhalation anesthesia might cause dangerous anoxia. Intravenous Pentothal frequently is employed to produce a satisfactory induction to inhalation anesthesia and also is combined with curare, intercostal block, or spinal anesthesia. These combinations of agents and methods reduce the toxicity of the drug and give a high degree of oxygenation. Lundy[9] was the first to advocate this balanced or combined anesthesia in poor risk patients and demonstrated that the method is satisfactory in a wide range of cases. A slow, careful induction with nitrous oxide and oxygen followed by intravenous Pentothal provides a satisfactory combination. Equal parts of nitrous oxide and oxygen increase the percentage of oxygen in the inspired air and materially decrease the amount of Pentothal required. Excessive preanesthetic sedation should be avoided, especially in cardiac patients. The barbiturates and opiates lower the minute volume of respiration so that alveolar air is renewed infrequently, and severe anoxia may develop. The current trend of opinion is inclined toward increased usefulness and safety of intravenous anesthesia in combination with other agents and technics.

Spinal Anesthesia.—This method may be indicated in some cases, but often is contraindicated. Procaine is probably the agent of choice, but if risk is not great, Metycaine or Pontocaine may be used because of their longer effect. Spinal anesthesia is preferred by some physicians for many of the acute abdominal conditions, especially in cases of intestinal obstruction. In the poor risk patient, spinal anesthesia probably is most useful in operations on the lower extremities, the genitourinary tract, and in the lower abdomen. In considering the use of spinal anesthesia in poor risk cases it must be remembered that varying degrees of circulatory and respiratory deficiency are produced through paralysis of the sympathetic nerves and the intercostal muscles. The deficiency increases in severity with the depth of anesthesia until serious deficiency and varying degrees of anoxemia may occur.The fractional or continuous spinal method of Lemmon[10] has certain advantages for longer operations where spinal anesthesia appears to be indicated. Here a small initial dose is given and if the patient reacts favorably, subsequent doses may be added as needed. By this method it may be possible to prevent circulatory and respiratory depression which may follow a single large dose of a spinal agent. These patients must be well oxygenated at all times. The safety of spinal anesthesia may be materially increased when small doses of the drug are combined with a light plane of cyclopropane anesthesia or with equal parts of nitrous oxide and oxygen.

CONCLUSIONS

Although great progress has been made in providing adequate anesthesia for the poor risk patient, much remains to be accomplished if the morbidity and mortality of this class of patients is to be lowered still further. The patient's pathologic physiology should be considered at all times; in the preoperative stage, during operation and anesthesia, and in the postoperative stage. Close attention to these factors will result in lessened mortality following operation, in a smoother postoperative course, and in lessened morbidity. The anesthetist can contribute his part to the program of improvement by being careful in choice and application of the available anesthetic agents and methods. Only where there is close cooperation and active

consultation between the surgeon, the clinician, and the anesthesiologist can the operative and postoperative complications which are likely to occur in poor risk patients be prevented.

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Backache Following Spinal Anesthesia

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The incidence of low-back pain following spinal anesthesia is great enough to make it a matter of concern to anesthesiologists. Whether or not the act of introducing the anesthetic agent in the subarachnoid or epidural space is the cause of the complaint makes little difference to the patient. His attention is focused on the existence of his low-back complaint, not on its etiology and pathogenesis. Hardly an anesthetist or a surgeon has not been confronted with the patient with a true anxiety requesting—almost begging—for some type of anesthesia other than spinal because of untoward reactions which a member of his family or a friend attributed to the spinal anesthesia itself. The medicolegal aspects of this problem cannot be too lightly passed over because both the surgeon and the anesthetist are vulnerable.

The purpose of my presentation of this problem is to suggest means of anticipating and possibly preventing trouble for all parties concerned. To attempt to treat the problem after it has once arisen is too late because the anxiety has already assumed a fixed psychic pattern which is most difficult, if not impossible, to remove.

I believe the specialty of anesthesiology has matured sufficiently to insist that the anesthetist take cognizance of his responsibilities not only to the patient but also to the surgeon and to the institution in which he works. I believe the anesthetist has a responsibility which goes beyond the very act of administering the anesthetic agent and carrying the patient successfully through the operative procedure.

Evaluation of the patient before surgery and before the administration of the anesthetic agent or the preoperative medication is of equal importance to the skillful administration of the anesthetic agent itself. This cannot be done by a cursory examination of the clinical chart as the patient is being wheeled into the anesthesia room. It has been said many times before, and it probably will be said many times again, that you cannot evaluate the condition of a patient from a study of laboratory findings alone. It is not sufficient to check the blood count, urinalysis, and serology of the patient. Nor is it sufficient to accept the word of the radiologist that the preoperative chest x-ray studies were essentially negative. All these tests are of importance and should form an integral part of the preoperative study of the patient, but in themselves they are not sufficient to give the anesthetist that which he must have if he is to perform his duty and accept his responsibilities in the field of anesthesiology.

To avoid trouble from the patient who claims that his postoperative disability has been caused by one or the other of the anesthetic agents, particularly that used in spinal anesthesia, I recommend that the anesthetist prepare a small check-off type of record listing a few symptoms that can be quickly checked during preoperative examination of the patient, preferably the day before surgery. Such a record need not be detailed, nor is it necessary that it be a part of the clinical record. However, I can see that it would be a very valuable part of the record if complications should arise and the clinical chart be subpoenaed by the Court as a part of the testimony.

In this preoperative check-off of symptoms I would suggest the following: Previous history of backaches; previous history of lower extremity pain; difficulties or peculiarities of the gait, particularly a limp; difficulty with bowel and bladder function; headaches, vertigo, and disturbances of vision. I would also suggest that the patient be questioned with reference to specific diseases of the nervous system such as poliomyelitis or meningitis; diseases that might have affected the cardiorespiratory system, the kidneys, or the liver; and previous surgery, including type of anesthesia and sequelae of the anesthesia and of the surgery. While this may seem like a rather elaborate approach, I can assure you that if such information

were always available there would be little difficulty in proving that the anesthetic agent was not the cause of postoperative symptomatology.

Next in the preoperative approach to the patient, I would urge, in addition to evaluation of the cardiovascular and the respiratory status, a brief review of some pertinent neurologic signs. With the patient in the erect position the elicitation of the Trendelenburg and Romberg signs will give a very accurate evaluation of weakness of the lower extremities as well as possible disease of the pyramidal tracts of the cord. It is also possible to ascertain any asymmetries of development in the lower extremity, atrophy, and growth dystrophies of all types may be noted. Of particular interest to the anesthetist are the lateral and anteroposterior curves of the spine.

With the patient in the supine position the reflexes of Babinski, Gordon, and Oppenheim can quickly be determined; at the same time the presence or absence of ankle clonus can be noted. The abdominal reflexes, both superior and inferior, and, in the male, the cremasteric reflexes are of importance in detecting lower motor neuron lesions. With the patient in the sitting position the patellar reflexes can be tested, and in the kneeling position, the achilles and plantar reflexes. It is important to examine ocular reflexes before any preoperative medication is given.

This brief evaluation of the nervous system is not complete by any means nor is it intended to be. However, it will give the anesthetist a working knowledge of the patient and will provide an important record of the case.

Just recently I had referred to me a patient aged 49 who 4 years before had undergone a right inguinal herniorrhaphy under spinal anesthesia. Upon arising after surgery, weakness in the lower extremities was noted for the first time, and he has had an increasing and progressive disability affecting not only his lower extremities but his trunk and upper extremities as well. At the time he came under my care, the disability had advanced to the point that the patient was an invalid, unable to get about without help because of the weakness and paralysis in his lower extremities and the uselessness of his upper extremities.

Clinical examination revealed that the patient had a well-established case of multiple sclerosis, and it was impossible to disassociate the use of spinal anesthesia from the etiology and origin of his multiple sclerosis. It is quite possible that if this patient had had the simple preoperative examination outlined above, some of his symptoms would have been detected and perhaps the individual concerned with his surgery would have avoided a great deal of subsequent trouble.

Any patient who exhibits exaggerated patellar and tendon reflexes particularly preoperatively, diminished or absent superficial abdominal and cremasteric reflexes; a history of transient or permanent paresthesias in the extremities, particularly the upper extremities; and a history of disturbances of vision must be considered to have multiple sclerosis unless more thorough examination rules out that diagnosis. Obviously, in the presence of such symptomatology, a patient should not undergo spinal anesthesia unless the patient and the surgeon are fully aware of the possibilities of an underlying myelopathy.

Multiple sclerosis has a great variety of physical manifestations and in many cases is very difficult to diagnose accurately until it is well established. However, I have seen the disease discovered with alarming frequency, and I am fully convinced that it exists in far greater numbers of patients than we appreciate at the moment. In view of the unfavorable prognosis of this disease, it becomes increasingly apparent that it should be diagnosed before rather than after spinal anesthesia has been administered.

In the causation of backache following spinal anesthesia there are two factors which recently have come to my attention and which I believe to be worthy of note; I have not seen them mentioned in the literature. As you possibly know, my associates and I have made, in the course of our diagnostic procedures to determine herniation of one or more of the lower lumbar intervertebral disks, many subarachnoid punctures. We have also had the opportunity of examining by direct visualization at surgery these areas into which needles have been passed for introduction of contrast media. More recently we have observed the effect of direct passage of needles through the subarachnoid space into the nucleus pulposus for the injection of contrast media and direct examination of the nucleus pulposus by opacification.

We have seen that needle holes made in the dura by 22 gauge needles are patent for at least a week after the puncture. Spinal fluid leaked freely and in many cases spurted out under pressure, indicating that there may be continued seepage of spinal fluid into the epidural spaces for a week or longer after administration of spinal anesthesia. Resultant compression of the nerve roots, as well as of the cauda equina in general, might well be a positive factor in low-back pain following subarachnoid puncture. I also believe that this may frequently be the cause of so-called "spinal headaches." The leakage of spinal fluid may disturb the hydrodynamics of the cerebrospinal nervous system and produce the very distressing headache seen rather frequently following spinal anesthesia.

We have also observed another interesting phenomenon; the small fibers of the cauda equina frequently become herniated, and a loop of the small nerve fiber will herniate through the opening caused by the needle. This phenomenon has been observed in a surprising number of cases at the time of surgery on the lower back, and we feel that it may constitute another factor in the production of low-back or referred pain into the lower extremities following spinal anesthesia.

In addition to the above mentioned factors the possible role of existing myelopathies, spinal cord tumors, extradural space-taking lesions, and preexisting arachnoiditis or radiculitis must be mentioned. These pathologies may exist below the level of consciousness and undiagnosed at the time of surgery, only to be brought into activity by the spinal puncture. This procedure may set in motion irreversible factors producing back pain. Arthrodial lesions of the lower spine and the further strain of malpositions during and following surgery are all too familiar to osteopathic physicians.

One cannot ignore the great possibility of an anxiety neurosis in many patients. The unstable nervous system is quite prevalent and manifests itself in many ways. It may be that this is more of a factor than we are pleased to recognize.

There is no doubt that there are some cases of low-back pain caused by hypersensitivity to the anesthetic drugs employed in spinal anesthesia. Such drugs may produce low grade subarachnoiditis accompanied by low-back and possibly radicular pain.

CONCLUSION

1. To be forewarned is to be forearmed.

2. If abnormalities are encountered in the course of preoperative examination, the attending surgeon should be notified and surgery delayed if possible, pending a complete appraisal of the case.

3. The anesthetist should append to the chart a simple statement of his findings, prior to surgery, stating evidence of the abnormalities found and his opinion of the anesthetic problem if surgery is ordered to proceed.

4. If surgery is undertaken spinal fluid should be withdrawn at the time of spinal puncture for further study. In the study of the spinal fluid the colloidal gold curve and gum mastic determination are most important.

5. In administering spinal anesthesias I advocate smaller gauge needles. In addition, before the needle is withdrawn from the subarachnoid space, a small quantity of either saline or anesthetic solution should be injected to clear the way and to prevent possible herniation of the nerve roots.

6. Postoperatively patients should be kept recumbent with the head low to prevent the force of gravity increasing the loss of spinal fluid.

7. All cases of postspinal low-back pain or headaches should be reviewed by the department of anesthesia or, in smaller institutions, by the entire surgical staff. The complete evaluation of the case should be recorded either in the minutes of the staff meeting or appended to the patient's chart.

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The Anesthetic Management of Tonsillectomies in Children

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Tonsillectomy is a minor operative procedure accompanied by the administration of major anesthesia. Too often, assistants, nurses, and interns are given the duty of anesthetization, where the more accomplished anesthetist should be available to provide a safer and smoother anesthesia. The purpose of this paper is to present some of the important factors in the management of these cases. The observations are based on experience gained in the personal administration of 2,000 tonsillectomy anesthesias.

The routine tonsillectomy patient enters the hospital the day prior to scheduled surgery and has a complete physical examination, blood count, urinalysis, determination of bleeding and coagulation times, and chest survey film. The evening preceding surgery a 2-quart saline and glucose rectal irrigation is administered, to build up a glycogen reserve and help hydrate the patient in order to combat acidosis. Breakfast is omitted in the morning, but clear fluids are permitted up to 2 hours before surgery, again, to combat dehydration and subsequent acidosis.

According to Jackson,[1] the emotional trauma associated with anesthesia is recognized by psychiatrists as one of the causes of behavior problems in children. Those of us who are engaged in the practice of anesthesiology have the responsibility of avoiding or diminishing as much as possible the precipitating circumstances. Jackson[1] recommends a preoperative visit to the child soon after admission to the hospital, to help dispel fear by attempting to gain the child's confidence and assuring him that he will not be hurt. She has concluded that after proper visitation and explanation to children, less anesthesia is necessary, inductions are quieter, excitement stages are milder, no depression results from premedication, and there are quieter operating rooms on the morning of tonsillectomies.

On the other hand, there is much to be said for the use of premedication. Basal anesthesia has long been advocated as an effective prophylactic against psychic trauma. Various drugs have been used, including paraldehyde, Avertin, and barbiturates, the most popular of which has been the use of a Pentothal sodium solution given by rectum. However, barbiturates cause slight to moderate respiratory depression when used as premedication or in basal anesthetic doses, and this depression will slow the induction period of inhalation anesthesia. Two other disadvantages in the use of barbiturates are delay in regaining consciousness and some dulling of activity of the pharyngeal reflexes, two factors of utmost importance in the child undergoing tonsillectomy, with the associated postoperative blood and mucus.

The rectal use of Pentothal has been advocated by Weinstein and Light;[2] Burnap, Gains, and Watts;[3] and Mark, Fox, and Burstein.[4] A 10 per cent solution of sodium Pentothal is administered 15 to 30 minutes prior to anesthesia and the dose calculated on the basis of 13 to 20 mg. per pound of body weight. The method has many advantages and approaches the ideal basal premedication for children. However, there is delay in recovery, and because of obtunding of pharyngeal reflexes, aspiration with subsequent bronchopneumonia may be a complication. In addition, Artusio and Trousdell[5] report that in a series of 50 cases in which rectal Pentothal sodium was used there was 1 case of tonsillar bleeding which they felt might have been recognized earlier had it not been for the postoperative depression. The use of Pentothal sodium by rectum is highly recommended as a basal method in children, but its use as preoperative medication in tonsillectomy should not be routine.

In my cases the usual preoperative medication consists of morphine and scopolamine in the dosages recommended by Leigh and Belton.[6] Although the use of premedication in infants and children has been a controversial subject for some time, it has been generally conceded that the advantages in the use of premedication far outweigh the disadvantages. It is certainly desirable to lessen apprehension and reduce excitability, as we attempt to do with adults. One of the most important effects is the prevention of a rapid exhaustive respiratory rate as the attendant quiet breathing preserves the energy of the child. Moreover, opiates do not have the same soporific effects on children as they do in adults, but bring the child to the operating room awake and quiet. The other great advantage in the use of premedication is the reduction in the amount of anesthetic agent required, with subsequent earlier recovery. Nonmedicated or poorly medicated patients are more likely to vomit during anesthesia induction. Furthermore, a child who

has not had any preoperative medication may scream so during induction that jerky gasping respirations may continue throughout the course of the anesthesia.

The oral use of barbiturates, in addition to allaying apprehension, offsets the nausea and vomiting produced by morphine. It is also used to prevent convulsions during induction, particularly with Vinethene ether where there is inadequate carbon dioxide elimination.

In using morphine as a premedicant, it is argued that there is increased incidence of nausea and vomiting as long as 24 hours postoperatively, especially with the larger doses, and that this will produce acidosis. It is also argued that morphine causes respiratory depression. However, in the dosages recommended, the decrease in respiration rate and minute volume is an advantage because it prevents rapid exhaustive breathing. In addition, morphine increases the sensitivity of the respiratory center to carbon dioxide stimulation. On the other hand, morphine increases intracranial pressure, and should not be used when intracranial pathology is present. Smith[7] also points out that morphine premedication should be omitted when cyclopropane is administered because of the greater incidence of cardiac irregularities resulting from use of morphine and cyclopropane in contrast to the use of cyclopropane alone.

The effect of the belladonna drugs is to reduce respiratory tract secretions. Scopolamine is more desirable than atropine because of its longer action—an adequate dose will last over 1½ hours—whereas comparatively larger doses of atropine will last less than half that time. Belladonna derivatives, being parasympathetic paralyzants, also reduce vagal or vagovagal reflexes, which may appear with certain operative procedures. These drugs also may cause a slight rise in body temperature as they suppress sweating, a circumstance given the name of atropine fever by White.[8] But a dry respiratory tract is much more important than these effects. Scopolamine in adequate doses often produces a flush of the face, neck, and upper trunk, due to its vasodilatator effect on the cutaneous blood vessels. The flush resembles and has often been mistaken for scarlet fever, especially with its accompanying rise in temperature. However, the flush usually subsides by the time the operation is finished and is of no consequence. Scopolamine, in addition, is a central nervous system depressant—it reduces excitement and produces tranquillity and a certain amount of amnesia. However, as Waters and his associates[9] have shown, scopolamine is stimulating to the respiratory center of the medulla; therefore, by combining the morphine with scopolamine, the depressant effect of morphine on respiration is counteracted. Waters' experiments prove that with balanced doses of scopolamine, otherwise poisonous amounts of morphine may be administered to man without lowering the respiratory exchange.

That scopolamine is a more effective agent than atropine in minimizing secretions is well demonstrated by West and Papper's[10] series of 263 children undergoing tonsillectomies, in which scopolamine proved superior. Further, as Allen and his coworkers[11] have shown, the signs of asphyxia produced by nitrous oxide-oxygen anesthesia are influenced by the premedication, with the morphine and scopolamine combination producing fewer masking effects upon signs of asphyxia than other combinations of drugs, particularly morphine and atropine. The morphine and scopolamine is usually given an hour prior to induction, whereas morphine and atropine, should it be used, is administered only ½ hour before induction because of the shorter action of atropine.

During recent years the use of nitrous oxide has become less popular for adults, and used more for children. I prefer to use the nitrous oxide-oxygen-ether sequence for tonsillectomies for the following reasons:

1. Its pleasant induction—the child can be put to sleep with nitrous oxide-oxygen without resistance and excitement, since it is pleasant to inhale
2. Because nitrous oxide disturbs metabolism less than any other agent
3. With the use of a gas machine, an oxygen supply is necessarily at hand should resuscitation be necessary.

However, the safe administration of nitrous oxide-oxygen anesthesia depends upon thorough training of the anesthesiologist. It can be a dangerous method in the hands of the novice, because a child may go into the asphyxial stage very quickly, and the novice may mistake the cry and muscular movements that develop in this stage as indicating too light anesthesia and administer more nitrous oxide instead of oxygen. The most important factor to be considered in the use of nitrous oxide in pediatric anesthesia is, as stated by Leigh and Belton,[12] the avoidance of dangerous degrees of hypoxia. They urge that the anesthetist not be ashamed to supplement nitrous oxide with a stronger agent. When administering nitrous oxide, the anesthetist must be ever conscious of the signs of anesthesia under this agent. Irregular respiration, with occasional breath-holding on inspiration, is a sign of too light anesthesia. As anesthesia deepens, respiration becomes regular and may become rapid if oxygen want or carbon dioxide excess exists. Deeper anesthesia prolongs expiration and gradually slows the respiratory rate. Still deeper, and respirations become irregular again; there is a short inspiratory phase with greater prolonged expiratory phase; the rate slows still more and finally may cease. Phonation and jactitation also are signs of hypoxia. Another sign of hypoxia is the apparent escape of the pupil under the lower eyelid, away from the light. The eye signs otherwise resemble those of adults. According to Leigh and Belton,[13] under the effects of profound hypoxia the lids often open wide and the patient seems to stare at the anesthesiologist as if in reproach. Pupils are fixed and dilated. If he does not give oxygen immediately the anesthetist will be haunted by memories of that stare.

The technic we use is as follows: With a Heidbrink machine and using a semiclosed carbon dioxide absorption technic, the proper size mask is held close to, but not on, the child's face, The flush valve for nitrous oxide is depressed delivering a flow of 100 per cent nitrous oxide which is diluted with atmospheric air as the child inhales. While induction is taking place, the child is spoken to quietly and pleasantly about his interests. He is continually reassured, and the conversation is continued uninterrupted to divert his attention from the mask and procedure until resistance ceases and the child is breathing regularly. Meanwhile, the mask is being lowered gradually over the child's face, first on his chin and then, when respirations are regular, over the bridge of the nose. At this time oxygen is delivered at the rate of 500 cc. per minute and nitrous

oxide at 2 liters per minute. The absorber is then turned off and carbon dioxide excess allowed to build up to stimulate respiration. After, and only after, the child is asleep, the mask is tested for tight fit by closing the exhalation valve and exerting slight pressure on the breathing bag. If the mask does not fit tightly, proper adjustment is made or the mask is changed for one which fits. Unless the mask fits tightly induction and deepening to second plane ether anesthesia is prolonged and often difficult.

The exhalation valve is then opened and anesthesia continued with an 80 per cent nitrous oxide—20 per cent oxygen mixture until the child is in the first plane of the third stage of anesthesia and all nitrogen has been eliminated through the exhalation valve. The carbon dioxide absorber is now turned on, oxygen decreased to 200 cc. per minute, and nitrous oxide discontinued. The ether vaporizer is gradually turned on and the carbon dioxide excess, which was allowed to build up, stimulates respiration until the ether vapor itself produces stimulation. The increased respiratory rate and amplitude causes quicker anesthetization, since the ether is absorbed more readily. The ether-oxygen mixture is continued until second plane of the third stage is reached. At this point the anesthesia machine and mask are dissembled and the mouth gag and ether hook are inserted into the mouth. Now ether-air anesthesia is continued by oropharyngeal insufflation, with warmed ether vapor which is less irritating to the respiratory mucosa than nonwarmed ether and air. By the time anesthesia is being continued with insufflation, the child has emerged slightly to lower first plane, where anesthesia is continued throughout the surgery.

Anesthesia should be deep enough to abolish the pharyngeal reflexes, but not the cough reflex, as it is a protective mechanism for the child. A cough during the tonsillectomy should warn the anesthetist that some foreign material has started toward the trachea and immediate investigation is necessary. Never deepen the anesthesia when cough occurs, but wait until the material is coughed up or aspiration is performed before continuing with the surgery. If during surgery, cyanosis develops or respiration ceases oxygen should be administered under pressure, care being taken not to inflate the stomach. This can be avoided by having the surgeon place his hand over the child's stomach and press down. During maintenance and surgery, the head is kept lowered so that blood, mucus and any vomitus may accumulate in the hypopharynx.

In our practice total operating time has been shortened since we instituted the technic of having adenoids removed first. This allows coagulation to take place (usually in 3 to 4 minutes) while the tonsils are being removed. If the adenoidectomy is performed last this same period of time must be allowed to elapse while bleeding from the adenoid area is controlled. By proper gauging of time, depending on the operator, ether is discontinued and the patient allowed to emerge so that the pharyngeal reflexes are active when he is returned to the ward.

Postoperatively, the patient is placed in Trendelenburg position on his side. The lower leg is flexed at thigh and knee, the upper leg extended and the arms extended in front of the body. This position promotes gravity drainage of blood and vomitus and at the same time prevents the tongue from obstructing the airway. The child is allowed to react, with the intern in attendance, until all retching, bleeding, and vomiting have ceased and throat reflexes are active. Recoveries are generally quiet because of the premedication.

COMPLICATIONS OF ANESTHESIA

According to Smith,[7] "When one compares the complications of anesthesia in pediatrics to those of anesthesia in adults it is apparent that there is a similarity in the nature of complications, but a marked difference in the rate and time of incidence. Anoxia is the greatest single danger in anesthesia in pediatrics as it is with adults, but evidence is given that the effects are manifested more quickly. Apnea, shock, and pulmonary edema will occur rather than such delayed effects as hypostatic pneumonia or atelectasis." In children under anesthesia, respiratory complications are much more common than circulatory disturbances. Circulatory disturbances are not usually announced by a marked rise in pulse rate, but rather with the onset of shock there is an accompanying weak and thready pulse. The first change occurring in shock is usually a slowing and weakened heart beat, due to myocardial anoxia.

In our series of tonsillectomies there have been no deaths and no sequelae attributable to anesthesia. Postoperative bleeding has occurred in less than 1 per cent of cases, and in the majority of these cases hemostasis was accomplished without resorting to reanesthetization. One complication which has occurred often is the inadvertent extraction of already loosened deciduous teeth. Only once was x-ray examination necessary to confirm the fact that the tooth was not aspirated.

SUMMARY

The anesthetic management of tonsillectomies in children has been presented. The psychologic preparation of the patient and the advantages and disadvantages of preoperative medication, including barbiturates, morphine, and the belladonna derivatives have been discussed. The inhalation technic used, nitrous oxide, oxygen and ether, was described and the nature of complications briefly reviewed.

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Book Notices

THE PRINCIPLES OF OSTEOPATHY. By Leon E. Page, D.O., Associate Professor of Anatomy, Chicago College of Osteopathy. Cloth. Pp. 292, with illustrations. Price $10.00. The Journal Printing Company, 119 S. Elson, Kirksville, Mo., 1952.

This volume is the most ambitious project yet undertaken by the Academy of Applied Osteopathy. Commissioned as a text for undergraduate osteopathic students, it merits reading by every osteopathic physician, and by physicians of other schools of practice. It will not answer satisfactorily all the questions which members of the latter groups would raise, but it could serve to elaborate for them certain principles which would serve as a fundamental basis for their further investigation. It cannot, nor can any book, make osteopathic physicians by its reading. The specific manipulative technics which constitute a distinctive contribution of osteopathy to the healing arts will not be found here nor in any other such text, except as they illustrate principles. The application of those technics is learned, as is any highly developed skill of nerve, muscle and hand, by doing. A text on the technics of surgery, on playing billiards or golf, or on mastery of the piano is a useful thing and tells something of the why, of the know-how of these skills, but it cannot successfully impart them.

The motif of the book is clearly expressed in the author's preface as an "elaboration of the philosophy of osteopathy which constitutes a rational approach to clinical problems." He has planned the presentation of his basic material with the ideal of "develop[ing] the philosophical concepts of osteopathic therapeutics by establishing an historical background proceeding through the basic medical sciences and to point out the application of these principles to the actual clinical problems with which the physician must deal."

The selection of Leon Page by the Academy as the author of this text was a happy one because of his being peculiarly fitted for the task. He has had a wide background of osteopathic practice and teaching; his lifetime has been cast within the profession's richest period of development. He has known at first hand the creative figures of its various groups, including many older men who worked under Still. At no period has his thinking been sectarian, and he has not been led astray by a charismatic approach, nor unbalanced by enthusiasm. Osteopathy to him has never been dogma, yet he has never lost sight of the distinctive contribution which it has made to medical science. And throughout his professional lifetime he has ever been the scholar, gifted with a facile pen. This volume reflects all those experiences and characteristics of the author in good measure. It is a mature and balanced study.

The text is divided into three parts, of which Part I establishes the historical continuity of osteopathy as one with medicine, using that term in its generic sense. The author divides medical history into the commonly accepted ancient, medieval, renaissance, and modern eras, with a brief statement characterizing each. The contribution of great doctors for each era is evaluated, with four representatives selected from the modern period. In this way osteopathy is related to medicine biographically. Andrew Taylor Still, in the line of great doctors, is seen as intuitively conceiving a philosophy of health and disease and, by his practice, teaching, and writing, establishing the basis for a complete system of medicine. Forced by the ignorant prejudice and closed minds of his contemporaries, he launched an independent system of practice.

The author carefully abstains from employing the term "osteopathic medicine" which has come into rather wide usage throughout the profession in the last decade, possibly in consideration for those osteopathic physicians to whom the term constitutes a semantic blockage. But its usage or nonusage is quite unimportant. The phraseology employed to describe the various periods of medical development is important only to the degree that it clarifies in a reader's mind time relationships in that development. There have been many systems or "schools of medicine." Americans of the older generation will recall especially the homeopathic and eclectic schools, and that named in derision by its opponents, the "allopathic" school. Osteopathy itself arose in this period of systems. And there were many others in Europe that remain unknown except to the student of medical history. Organized medicine today, represented by the American Medical Association, the inheritor of the "allopathic" traditions, seeks to escape from any stigma of a system or sect, by proclaiming that medicine properly knows no system, nor has it a philosophy.

But medicine generically is one of man's great cultural heritages and disciplines, constantly changing, developing, and enlarging its horizons. It is acted upon by social forces and interacts with them as does any of man's institutions. In certain ways its organizational development is analogous to that of the Christian church. Osteopathy is a part of medicine and cannot be separated from its history by the dictum of any group from within. Organized medicine dismisses the validity of a unifying principle, a philosophy of medicine, and prides itself upon such a denial. Osteopathy affirms a set of unifying and persuasive principles. And in that difference of approach to the problems of health and disease lies a basic distinction between osteopathy as a system of medicine and organized ("allopathic") medicine.

It seems to this reviewer that a brief exposition of the place of osteopathy in medical history would be better served by a study of trends and movements illustrating historical processes at work in medicine, than does the biographical method such as the author employs. Such an exposition has yet to be done and there is a demand for it. But that could constitute a book in itself. Individuals need the satisfaction that comes from a sense of integration with history as it relates to their own time and place. This volume does give the reader a lively consciousness that osteopathy has its historical place in the healing arts, and that it cannot be dismissed glibly as a cult.

Part II deals with the fundamental basic sciences of anatomy, physiology, and pathology. The author is a teacher of anatomy and that section of the book seems especially well developed. This is a logical emphasis in view of the fundamental tenets of osteopathy. Chapter III of this section deals with a principle distinctive to osteopathy, that of the osteopathic structural lesion. This principle stems from an original postulate of Still concerning anatomic maladjustment, especially the spinal articular lesion. Research in the early days of osteopathy centered around the effects of this type of lesion and was prone to lay emphasis on the effect of single lesions. More modern research concerns itself with the osteopathic lesion complex, which reaches far beyond the immediate effect of a single spinal lesion or group lesion, to include effects upon interrelated body structures. These effects in turn can become causal. Thus the role of the osteopathic vertebral lesion passes beyond that of a static structural perversion to become a somatic problem, with a cycle of cause and effect, in which numerous reciprocal interrelationships are involved. Structural maladjustment is thereby seen as a dynamic process with ramifications extending from one organ system to another, involving the principle of body unity in health and disease.

Part III, the last section of the text, is entitled "Principles of Structural Therapeutics in Osteopathy," of which Chapters I and II are closely related to Chapter IV of Part II referred to above. The references of these three chapters, drawn largely from osteopathic literature, constitute a study of the somatic components of the disease process. Their study could help dissipate the criticism of the uninformed that osteopathic theory is a dogmatic statement of unsubstantiated belief, having no basis in the demonstrable facts of human physiology.

Chapter I of Part III is prefaced by a chart in which "osteopathic structural therapeutics (osteopathic medicine)" is conceived as a complete system of therapy. The chart would be useful as a teaching aid illustrative of the scope of osteopathy as conceived by Still. And that the scope was broad has been the almost unanimous opinion of those who came in contact with him personally, for a period long enough to appreciate the breadth of his conceptions. For what he taught was often more important than what he wrote. The

author is conversant with all that Still taught and interprets him broadly, thereby making a logical case for his premise that structural therapeutics is a complete system of medicine. It will be difficult for physicians of other schools of practice to accept the classification of specifics, antibiotics, anesthetics, antiseptics, and symptomatic drug therapy as "adjunctive therapy" and to understand Page's reason for doing so. The classification per se is not acceptable to this reviewer as definitive, unless it is presented not as a finality, but as a methodology of teaching. As such it is acceptable. Page is in no sense dogmatic and mechanistic in his thinking, and the reviewer believes that the author puts forth the classification for what it is, a dialectic teaching aid for the student. It could confuse, however, the literal minded, the uninformed, and those individuals who are satisfied only with fixed formulas.

Careful reading of the entire book, with extensive use of the references, will give the osteopathic physician a sense of integration of his school of medicine with the great body of medical practice. And it could bring to the physician of the other unlimited school of practice a sense of the usefulness and logic of a philosophy of medicine. Such doctors would insist that much osteopathic research that has been done is incomplete and that very much more needs to be done by modern standards. But if open-minded, they would grant that the osteopathic concept establishes certain hypotheses, which if not proved have not been disproved and, therefore, are acceptable as hypotheses. They would grant that these hypotheses have never been explained to the fullness of their implications nor permitted to develop logically certain of their basic propositions. And if they were not too mind-set, not too unimaginative to grasp the totality of thinking involved, they would grant that within the osteopathic concept as it emerges from this book there is a field rich for exploration and development, to the unlimited benefit of a great section of man's knowledge, the field of medicine itself. A text which will do this is an achievement.

The author has had the benefit of wide professional consultation which adds to the text's authenticity, and to these consultants he gives due acknowledgement. The Foreword was written by Thomas L. Northup, D.O., whose great contribution to his profession has been the careful guidance he gave the Academy of Applied Osteopathy in its early organizational stages, especially in the period when it could have readily become a splinter group. The title page bears the inscription, "A Harry L. Chiles Memorial Publication"; the volume is dedicated to Ralph W. Rice. Both men made contributions to the growth and development of the profession which were inestimable in value, and both belong to an early group to whom osteopathy was a vocation in the dedicated sense of that word. The illustrations are numerous and of excellent quality. Six plates in color from the Ciba collection of medical illustrations add to the teachability of the text and to its attractiveness. X-ray illustrations are excellently reproduced in the negative. The printing and binding are of high grade. The author's style flows evenly, is crystal clear and interesting, and the presentation of his material moves with analytical precision.

Attention is called to the presence of certain technical errors in the book, mainly infractions of the principle of uniformity of style. Several occur in the index resulting in alphabetical transposition. This type of error creeps in most frequently in publications by firms relatively inexperienced in book production. Competent technical editorship must be supplied for it is not within the province of authors or editorial consultants to supply it. These errors will doubtless be found and corrected in subsequent editions.

As a text, this volume should have the widest possible use in our colleges, and a wider reading by osteopathic physicians everywhere. In a day when the uninformed, both within and without the osteopathic profession, are questioning the right of osteopathy to occupy a distinctive place in the healing arts, this book does much more than conserve old values, it becomes a positive contribution to the philosophy of the medical arts. It is a modern contribution to medical literature and is warmly commended.

THE CYCLOPEDIA OF MEDICINE, SURGERY, SPECIALTIES. Editor-in-Chief, George M. Piersol, M.D., Professor of Medicine and Director of the Center for Research and Instruction in Physical Medicine, Graduate School of Medicine, and Professor of Physical Medicine, University of Pennsylvania; Assistant Editor, Edward L. Bortz, M.D., Associate Professor of Medicine, Graduate School of Medicine, University of Pennsylvania; Past President, American Medical Association. Cloth, Fourteen loose-leaf volumes and Index, with illustrations. F. A. Davis Co., 1914-16 Cherry St., Philadelphia 3, 1952.

The developments in the medical field have become so extensive and have come so rapidly that it is now completely impossible to carry on a practice with any degree of efficiency without recourse to authoritative literature. And having such literature at hand is a problem even for the physician in localities where medical libraries are available; it is a much greater problem to those doctors who are located in small towns and rural communities.

From the time of its first publication 20 years ago the "Cyclopedia of Medicine and Surgery" has been found useful and reliable. With the publication of the new looseleaf edition its usefulness has been extended and its reliability continues high.

The revolutionary advances in medicine and surgery have made it necessary largely to rewrite and wholly to reprint the Cyclopedia. For the monumental task of rewriting and re-editing, the staff of associate editors and contributors assembled to work with the editor-in-chief, George M. Piersol, comprises a large number of the best-known names in American medicine today. Edward L. Bortz is assistant editor, and the chief associate editors are Alton Ochsner, Archibald D. Campbell, Frederick H. Falls, Francis L. Lederer, Robert A. Lyon, and Conrad E. Berens.

The format of the new work has been radically altered. The pages, printed on lighter weight paper, are made up in volumes of uniform thickness in looseleaf binders. The publishers plan, by making use of the looseleaf binding, to bring out a substantial amount of new material each year. In addition they will continue to publish a yearly service volume which will provide a review of outstanding developments. Either or both of these services will be available to subscribers. Thus it will be possible for the Cyclopedia to continue to be serviceable far longer than if it were permanently bound.

The subject matter is presented in cyclopedic form, for the most part alphabetically arranged. In general a definite plan of presentation has been followed. Diseases are discussed in a systemic manner with emphasis on symptomatology, differential diagnosis, and therapy. Drugs are discussed especially from the standpoints of pharmacology, untoward reactions and poisoning, and therapeutic applications. In conformity with the policy of the Cyclopedia, treatment in its broadest interpretation has been given a prominent place in all discussions of diseases and drugs. Those drugs which are now of greatest use are considered at length, while those of decreasing usefulness are considered in less detail or have been eliminated. Basic fields of therapy, including surgery, dietetics, radiation therapy, physical and occupational therapy, endocrine therapy, and psychotherapy, have been given special attention.

Anesthesia, a subject which is of interest not only to the anesthesiologist but to all physicians, is given extensive and comprehensive coverage—172 pages. Operative risk, preanesthetic medication, Avertin rectal anesthesia, inhalation anesthesia, regional anesthesia, spinal anesthesia, and intravenous anesthesia are presented by specialists in the field.

The various antibiotics are treated both as separate entities and in relation to the various diseases in which they are applicable. Body weight, which is being recognized as having profound physical and emotional significance, is discussed at length. Appended to this discussion, as to many others, is a list of related subjects, a helpful device for guiding the student or busy doctor in the way that he should go.

Recognition of the increasing importance and seriousness of cardiovascular diseases is reflected in the 817-page section devoted to them. No new phase of diagnosis and treatment has been left uncovered.

The section on radiology has been expanded to cover the cyclotron and atomic energy, the use of radioactive iodine in medicine, and the current modes of diagnostic roentgenography

and therapeutic radiation. Deep therapy radiation and treatment of pelvic malignancy are sections which are of particular interest.

The newest of medical specialties, physical medicine, is dealt with in practical articles on rehabilitation and occupational therapy. Psychiatric subjects cover everyday problems, such as psychosomatic conditions and the difficulties that arise in marriage and the rearing of children.

Use of the Cyclopedia is easy because of the alphabetical arrangement, and it is facilitated by the liberal number of cross references and by an index volume. Bibliographic references have been kept at a minimum and in general have been provided only for important contemporary contributions.

In closing his Preface to the Third Edition, Dr. Piersol says that this work "has been planned to provide a complete, compact, reference library sufficiently scientific to prove useful to teachers and investigators, as well as to medical students, interns, and residents; one that will provide specialists with complete up-to-date reviews of their respective fields; and, above all, one that in a single set of convenient books, will make available to the hard-pressed general practitioner authoritative practical information on every phase of medicine." In the opinion of this reviewer this purpose has been as nearly achieved as is possible in this rapidly changing world.

DOCTORS DIFFER. By Harley Williams. Cloth. Pp. 239, with illustrations. Price $5.50. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1952.

The distinguished British physician who is the author of these five sketches of physicians presents them as little biographies in contrast. Two other sketches find their way into the study. Of special interest are the contrasting studies of William Osler and James Mackenzie. The one is the apotheosis of the urbane and scholarly, the great humanist in medicine, not the discoverer of knowledge but the carrier to those less informed; the other, long a country doctor and a general practitioner, had none of the catholic taste nor the complicated and fascinating personality of Osler, but possessed an inborn gift of ceaseless questioning that bespoke the research mind and brought him high recognition. Both Osler and Mackenzie illustrated by their lives that medicine in itself is both an art and a way of life, but they exemplified it in utterly different ways.

The author supplies as a theme for the book Rembrandt's famed painting, "The Anatomy Lesson of Dr. Nikolaas Tulp." Just as each doctor brings to the anatomy lesson diversified and conflicting points of view, so do the physicians sketched by the author bring a different philosophy to their practice of medicine. Each is different, and each is right.

All of the sketches are interesting and of value to the physician to whom his profession is more than a way to make a livelihood.

CLINICAL HEMATOLOGY. By Maxwell M. Wintrobe, M.D., Ph.D., Professor of Medicine and Director, Laboratory for the Study of Hereditary and Metabolic Disorders, University of Utah, College of Medicine, Salt Lake City, Utah; Formerly Associate in Medicine, Johns Hopkins University, Associate Physician, Johns Hopkins Hospital, and Physician-in-charge, Clinic for Nutritional, Gastro-Intestinal and Hemopoietic Disorders, Baltimore, Maryland. Ed. 3. Cloth. Pp. 1048, with illustrations. Price $12.50. Lea & Febiger, Washington Square, Philadelphia 6, 1951.

Consistent with the changing emphasis and rapidly developing cytologic technics, this latest edition of the leading text on hematology has been revised to include recent discoveries in that field. Significantly, the consideration of blood dyscrasias has become more basic; the emphasis is not so much upon hemolytic disturbances, their symptoms and treatment, but more upon the cytologic and biochemical etiology of blood anomalies.

Eminent in the field of hematology, Dr. Wintrobe has re-evaluated the entire text, deleted a great deal of outdated material, and added much new and important material. The portions dealing with bone marrow, coagulation, hemolytic diseases, and hemolytic anemias have been revised. Sections on cytochemistry, inheritance of hemopoietic disorders, and new chemotherapeutic agents have been added.

An authoritative text, lucidly written, well illustrated, completely indexed, and with ample references, this edition should be added to the earlier ones already much used and should be an immediate acquisition for any practitioner not already aware of its excellence.

ESSENTIALS OF PHARMACOLOGY. By Frances K. Oldham, Ph.D., M.D., Research Associate in Pharmacology, The University of Chicago, F. E. Kelsey, Ph.D., Associate Professor of Pharmacology, The University of Chicago, and E. M. K. Geiling, Ph.D., M. D., Frank P. Hixon Distinguished Service Professor and Chairman of the Department of Pharmacology, The University of Chicago. Ed. 2. Cloth. Pp. 462, with illustrations. Price $5.00. J. B. Lippincott Company, East Washington Square, Philadelphia, 1951.

The subject material presented in this second edition constitutes an introductory course in pharmacology of value to the student or to the practicing physician. Since most college courses in pharmacology are limited in both time and detail because of the rapid development in the field, this text is likewise brief, and is intended, as the authors explain in the preface, "to serve the purpose of a broad survey of the field and as a background for further and more detailed studies of particular aspects of the subject."

Drugs having similar activity and characteristics are discussed by chapters, in regard to composition, uses, and therapeutic dosages. Each chapter ends with a list of the important official and nonofficial drugs available and adequate references also are provided for the benefit of those intending further study.

In this edition, recent advances in pharmacology have necessitated additions and revisions including sections on radioactive isotopes, adrenal and ganglionic blocking agents, and antihistamines. New agents such as ACTH, cortisone, and the antibiotic drugs also are discussed.

The material of the volume is presented with clarity and conciseness, and within its intended limitations, appears to serve its purpose adequately.

MAN AND HIS GODS. By Homer W. Smith. Foreword by Albert Einstein. Cloth. Pp. 501. Price $5.00. Little, Brown and Company, 36 Beacon St., Boston 6, 1952.

Doctors will be intrigued by the fact that the author of this book, which is obviously well without the wide field of medicine, is a professor of physiology and a urologist. Although he is outside the tradition of American medicine in which too often the physician is primarily a technician working within a highly specialized branch of man's knowledge—he is within a much older tradition of the doctor as a member of the learned professions and as such the possessor of a broad knowledge of man's disciplines.

The outline of the book is historical with its central theme, "the boundless suffering which, in its end results, this mythic thought (i.e. religion) has brought upon man" (quoting from the foreword by Albert Einstein) making it evident that here is a definitely antireligious book. It is written popularly, but its background is scholarly, and it has about it the ring of authenticity, even though it contains almost no documentation, and its author is far removed from his own special field of knowledge, and even though the material is slanted, it is based upon sound information which should be a part of modern man's knowledge. As such it must be accepted but with the warning that it develops but one sector of information.

In an epilogue the author compresses into forty pages his own *pro sua vita*, and does it with honesty and humility. Here can be traced the broad background of scholarship from which he writes.

This book could be read with great profit and interest by doctors who rarely venture into such fields. It would serve for them as a kind of "brain-dusting" (as termed by Osler) with a resulting spur to less muddled thinking in fields outside their own.

Current Medical Literature

ANTIBIOTICS AND LOW CERVICAL CESARIAN SECTION IN DYSTOCIA OR INTRAPARTUM SEPSIS

Before the advent of antibiotic drugs, low cervical cesarian section was considered an extremely dangerous operation for patients suffering intrapartum sepsis or dystocia, because of the possibility of severe postoperative sepsis and maternal death. However, Alfred J. Kobak, M.D., and his coworkers found that, where indicated in the presence of possible or actual infection, low cervical section is as safe as any other procedure if adjunctive preoperative and postoperative antibiotic therapy is employed. Their study, during which 140 consecutive typical cases were successfully concluded by this method without septic mortality, appears in the April 26, 1952, issue of *The Journal of the American Medical Association.*

Dystocia is considered present when labor has lasted for 24 hours or more. Fetopelvic disproportions or malpresentation are usually obvious causes of prolonged labor but borderline disproportion complicated by uterine constriction ring or inertia often make the decision for vaginal or cesarian delivery difficult. The use of antibiotic agents now enables a test of labor in these patients without endangering the success of later transperitoneal cesarian section if it becomes necessary. Women infected through neglect or liable to infection after rupture of the membranes in prolonged labor, should receive antibiotic therapy in addition to other measures regardless of the final method of delivery.

Since bacteria causing puerperal or postoperative infection are likely to be of more than one micro-organism group, the authors advise the administration of at least two antibacterial agents to give the patient overlapping protection and thus a better prognosis, with the precaution that the agents employed be carefully selected as certain antibiotics appear to be antagonistic to each other.

Recommended dosage, in the absence of intrapartum fever, is one large injection of penicillin—but if infection is already present, large frequent doses of antibacterial drugs should be administered. Postoperative antibiotic medication should be maintained until the patient demonstrates no fever for 3 full days.

The authors conclude, from their experience with this antibiotic management, that chemotherapy which increases the patient's resistance, rather than the type of cesarian operation selected, is the decisive factor in reducing postoperative sepsis danger. Among the 140 potentially or actually infected patients delivered by transperitoneal cesarian section with antibidity (49.2 per cent in actual and 29.3 per cent in potential infections) resulted. Most patients enjoyed mild convalescent biotic therapy, definitely decreased postoperative febrile morperiods and there were no maternal deaths.

SIMPLE TRACTION DEVICE

E. H. Wiessenberg, M.D., and his coworkers report in the August 9, 1952, *Journal of the American Medical Association* a simple device for applying traction to contractures in the hips and knees when the usual technics are not applicable. They illustrate their findings with a case history.

The apparatus comprises a piece of Masonite ⅜ in. × 16 in. × 18 in.; two pieces of plywood ½ in. × 6 in. × 6 in.; and eight small metal wheels. The wheels are attached to the plywood pieces (four wheels to each) and these dollies are placed on the Masonite board. The device, with a folded towel under the foot end, is then placed on the patient's bed; his heels are placed in gauze rings and then upon the carriages on the Masonite board. It was found that the dollies first move toward the patient (increasing the contracture) but the weight of the patient's legs gradually pushes his feet away from his body consequently reducing the contractures. The force of traction may be varied by increasing or decreasing the incline of the board.

The authors used the device successfully in the case of a patient whose legs, from the knees to the ankles, had received third degree burns. Treatment before hospitalization had been inadequate and severe flexion contractures in both hips and knees had resulted. While preparing the burned areas for plastic surgery the apparatus described above was tried in order to prevent further contracture and atrophy of the leg muscles. Because of the condition and location of the burns the usual methods of applying traction could not be used. But, with the aid of this device, the patient's legs were almost completely straight after 24 hours of treatment.

The authors believe this device helpful not only for this patient but also for arthritic patients and those needing similar postoperative traction.

A PLASTIC CLOSED-END RECTAL SPECULUM

A closed-end rectal speculum for office and hospital operations is reported by Charles Alexander Lamb., M.D., in the July 3, 1952, *New England Journal of Medicine.* This nonbreakable, plastic tube is designed with a hole and slit at different levels to facilitate pulling lesioned tissue into it by means of suction. This reduces bleeding otherwise caused by grasping instruments. The diagnosis is made in the usual manner, by rectoscope; the speculum is inserted; the tissue is pulled into the tube, provided it does not involve the muscular layer of the rectum; and the lesion is treated in the chosen manner.

The closed end of the tube reduces contamination and the plastic which is a poor conductor of heat and electricity and is easily cleaned permits a clear view of the field.

THE RELATION OF OBESITY TO MENSTRUAL DISTURBANCES

The correlation of overweight with menstrual disturbances is discussed by Joseph Rogers, M.D., and George W. Mitchell, Jr., M.D., in *The New England Journal of Medicine,* for July 10, 1952.

In their attempt to provide statistical evidence of increased incidence of obesity in the presence of amenorrhea, the authors studied women who were between the ages of 16 and 40, without pelvic abnormalities, and whose amenorrhea was not associated with systemic disease. Obesity was defined as 20 per cent or more over ideal weights described by the Public Health Service. Amenorrhea was considered present when menstruation was absent for at least 3 months.

Two groups, experimental and control, were set up containing 100 and 201 women respectively. The experimental group was composed of patients in whom amenorrhea, abnormal uterine bleeding, premature menopause, habitual abortion, and infertility were diagnosed. Only the first two conditions afforded significant statistical results. The control group exhibited none of these conditions.

The experimental group was subdivided according to the particular menstrual disorders. In comparison with the control group (13 per cent of these were obese) it was found that of the 60 with amenorrhea 29 (48 per cent) were obese. Of the patients (19) with functional uterine bleeding 58 per cent were overweight.

The groups were also divided into age categories (16-29 years and 30-40 years) and then subdivided according to complaint. In the younger group 47 had amenorrhea and 26 (55 per cent) were obese whereas in the corresponding control group the incidence of overweight was only 7 per cent. In the second age group 13 patients had amenorrhea of which 3 (23 per cent) were overweight. There was an 18 per cent incidence of obesity in the control group.

It is pointed out by the authors that the correlation between amenorrhea and overweight in both parts of the experiment is evident and they present the possibility that both the amenorrhea and obesity may be of a hypothalamic origin.

Conventions and Meetings

Announcements

American Osteopathic Association, Fifty-Seventh Annual Convention, Chicago, July 13-17, inclusive. Program Chairman, Roger E. Bennett, Middletown, Ohio.

American College of Osteopathic Internists, annual meeting, Hotel Huntington, Pasadena, Calif., October 14-17. Program Chairman, Neil R. Kitchen, Highland Park, Mich.

American College of Osteopathic Obstetricians and Gynecologists, annual meeting, Hotel Adolphus, Dallas, Tex., February 9-12.

American College of Osteopathic Surgeons, annual meeting, Neil House, Columbus, Ohio, October 26-30.

American Osteopathic Academy of Orthopedics, annual meeting, Neil House, Columbus, Ohio, October 26-30. Program Chairman, Warren G. Bradford, Dayton, Ohio.

American Osteopathic College of Radiology, annual meeting, Neil House, Columbus, Ohio, October 26-30. Program Chairman, J. Armande Porias, Newark, N. J.

American Osteopathic Hospital Association, annual meeting, Neil House, Columbus, Ohio, October 26-30.

American Society of Osteopathic Anesthesiologists, annual meeting, Neil House, Columbus, Ohio, October 26-30.

Arkansas, midyear meeting, Albert Pike Hotel, Little Rock, October 16.

Florida, annual meeting, June 11-13.

Georgia, annual meeting, Hotel Dempsey, Macon, May 1, 2. Program Chairman, Albert A. Jelks, Macon.

Hawaii, annual meeting, October 9-11. Program Chairman, C. W. Wyman, Honolulu.

Indiana, annual meeting, French Lick Springs Hotel, French Lick, April 26-28.

New York, annual meeting, Hotel Powers, Rochester, October 10, 11. Program Chairman, Hewett W. Strever, Rochester.

North Carolina, annual meeting, Battery Park Hotel, Asheville, October 24, 25. Program Chairman, Elizabeth E. Smith, Asheville.

Oklahoma, annual meeting, Hotel Biltmore, Oklahoma City, November 5-7. Program Chairman, Melvin A. Kiesel, Hinton.

Oregon, annual meeting, Multnomah Hotel, Portland, June 9-11. Program Chairman, D. H. Schmidt, Portland.

Osteopathic College of Ophthalmology and Otorhinolaryngology, annual meeting, Neil House, Columbus, Ohio, October 30-November 1. Program Chairman, Charles A. Blind, Los Angeles.

Rocky Mountain Osteopathic Conference, midyear meeting, Broadmoor Hotel, Colorado Springs, November 14-16. Program Chairman, Samuel V. Origlio, Denver.

Tennessee, annual meeting, New Southern Hotel, Jackson, October 12-15.

Virginia, annual meeting, Williamsburg, May 22, 23. Program Chairman, Felix D. Swope, Alexandria.

West Virginia, annual meeting, Daniel Boone Hotel, Charleston, June 7-9. Program Chairman, Theodore L. Sharpe, Martinsburg.

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CALIFORNIA

Long Beach

The officers are: President, Earl E. Watters, Compton; president-elect, Don C. Littlefield; and secretary-treasurer, Charles R. Posson, both of Long Beach.

The trustees are: Elmer S. Clark, Fred Dubin, and Ace Pettigrew, all of Long Beach.

Bureau chairmen are: Public affairs, Walter Mattocks; insurance, Robert A. Heller, professional affairs, Nicholas V. Oddo, all of Long Beach; and public service, Dr. Clark.

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1. Behrman, H. T., Combes, F. C., Bobroff, A., Leviticus, R.: Ind. Med. & Surg. 18:512, 1949.
2. Turell, R.: New York St. J. M. 50:2282, 1950.
3. Heimer, C. B., Grayzel, H. G., and Kramer, B.: Archives Pediat. 68:382, 1951.

Department chairmen are: Veterans affairs and military affairs, Dr. Posson; public health and child welfare, Wilmer Olson; publicity and publications, Dr. Littlefield; radio and ethics and censorship, Dr. Clark; speaker procurement and industrial accident insurance, Edward Neushutz; professional education, Clarence Wensley; hospitals and clinics and medical defense, Philip Reames; vocational guidance, James Jensen; membership, Carmen H. Chemberlen; historian, Henry Miles; health insurance, Dr. Heller; and reduced rates, Drs. Littlefield, Posson, and Chemberlen, all of Long Beach.

Pomona Valley

The officers are: President, Richard Eby; vice president, Richard Cavenaugh; and secretary-treasurer, Phillip Koppel, all of Pomona.

Redwood Empire

The officers are: President, Leslie A. Harper, San Rafael; president-elect, Betty A. Green, Huntington Park; and secretary-treasurer, Frederick P. Greiner, Vallejo.

The trustees are: Melvin L. Neilsen and Alfred C. Handy, both of Petaluma.

San Diego

The officers are: President, Richard L. Pascoe, San Diego; president-elect, Richard R. Fiala, Fall Brook; and secretary-treasurer, Gordon L. Krauss, San Diego.

Kenneth Forror, San Diego, is trustee.

COLORADO

State Society

The program which was to be presented at the meeting in Glenwood Springs on September 20, 21, included: "Osteopathic Manipulation in Relation to Office Proctology," Reginald Platt, Houston, Tex.; "Ligamentous Articular Release," Anna L. Slocum, Des Moines, Iowa; "Understanding the Osteopathic Lesion," Thomas F. Schooley, Phoenix, Ariz.; "The Added Tools of Osteopathic Diagnosis," Rollin E. Becker, Dallas, Tex.; and a round-table discussion on cranial osteopathy by all four doctors.

DELAWARE

State Society

The officers were reported in the July JOURNAL.

Committee chairmen are: Membership, John C. Bradford; Osteopathic Progress Fund and public relations, Leonard C. Lipscomb; public relations and legislative, A. A. Golden; educational programs and meetings, Merritt G. Davis; and hospitals, Henry George, III, all of Wilmington.

Edith M. Incabahian, Wilmington, is trustee at large.

FLORIDA

District One

The officers are: President, R. Philip Coker, Panama City; vice president, A. R. Frank, Marianna; and secretary-treasurer, Doris R. Coker (re-elected), Panama City.

GEORGIA

Atlanta

Speakers at the August 20 meeting in Atlanta were Ruth V. Glass, Atlanta, and Walter K. Cousins, Rockmart.

The next meeting was to be held in Atlanta on September 17.

ILLINOIS

State Society

The officers and trustees were reported in the July JOURNAL.

Committee chairmen are: Executive, Lloyd R. Wood, Oregon; ethics and censorship, Malcolm Tengblad; nominating, W. F. Strachan; Osteopathic Progress Fund, William Wood, all of Chicago; public education on health, C. E. Cryer, El Paso; professional education, Dale E. Craig, Joliet; constitution and bylaws, Harold M. Osborn; resolutions, Louise Astell, both of Champaign; budget, Harold W. Fitch, Bushnell; membership, J. K. Swain, Sterling; and liaison, Floyd F. Peckham, Chicago.

INDIANA

State Society

The officers and trustees were reported in the July JOURNAL.

Department chairmen are: Public affairs, Dale G. Treadwell, Auburn; legislative, Herman E. Rinne; compensation insurance, Paul B. Blakeslee; budget, Arabelle Wolf; revisions, Paul van B. Allen, all of Indianapolis; hospitals and clinics, Newal J. Roberts, Mishawaka; public health, John D. Hall, Kendallville; veterans care, Howard E. Eastman; press, Fred L. Swope, both of Richmond; professional affairs, L. A. Marohn, Elkhart; membership, Earl B. Cary, Brazil; ethics, E. R. Horton, Jr., Ft. Wayne; professional insurance, L. A. Rausch; civil defense, David E. Turfler, both of South Bend; vocational guidance, L. P. Ramsdell, LaPorte; Osteopathic Progress

Fund, V. B. Wolfe, Walkerton; convention, J. Wesley Elbert, Petersburg; public and professional affairs, F. E. Warner, Bloomington; radio, C. Allen Brink, Princeton; publications, Donald R. Hinton, Nappanee; and community activities, Lee W. Yoder, Wabash.

Fifth District

A meeting was scheduled for September 21 at McCormicks Creek State Park.

KANSAS

Arkansas Valley

A meeting was to be held in Larned on September 25.

Mid-Kansas

M. B. Willems, Hillsboro, led the discussion of gastric resections at the meeting on August 13 at Marion County Lake.

MICHIGAN

Southeastern

A meeting was to be held on September 7 in Monroe.

MISSOURI

Central Ozark

The officers are: President, Warren M. Cottingham, Rolla; president-elect; Ronald Scott, Bourbon; vice president, L. G. Myers, Richland; secretary-treasurer, John Mihalevich (re-elected); and corresponding secretary, Mrs. John Mihalevich, both of Crocker.

The September 4 meeting was held in Rolla.

Northeast

"Surgery of the Esophagus" was the subject discussed by Grover Stukey, Kirksville, at the August 14 meeting.

Ozark

The officers are: President, Mary King; vice president, Elmer Williams, both of Springfield; and secretary-treasurer, H. R. Agnew, Pleasant Hope.

The trustees are: William L. Wetzel, Springfield, and Homer Matz, Ash Grove.

Committee chairmen are: Membership, Paul I. Needham; ethics, William L. Wetzel; hospitals, Wilma Westfall; legislation, C. Andrew Wurst; public health, Leland E. Wetzel; public relations, Howard T. Mason; press, R. R. Reynolds; parliamentarian, Louise Remmert, all of Springfield; clinics, V. P. McCormick, Ozark; statistics, Carl Bailey, Urbana; convention program, Joseph G. Bennett, Buffalo; convention arrangements, Omer L. Bohrer, Lebanon; vocational guidance, R. C. Mitchell, Republic; and industrial and institutional service, W. F. Zumbrum, Boliver.

Southwest

The officers are: President, D. M. Russell, Carthage; vice president, C. B. Jogerst, Joplin; and secretary-treasurer, Harold E. George (re-elected), Mt. Vernon.

W. M. Jones, Neosho, is trustee.

Chairman of the ethics committee is Stanley J. Hayward, Mt. Vernon.

MONTANA

State Society

The officers and trustees were reported in the August JOURNAL.

Committee chairmen are: A.O.A. membership, F. L. Anderson; vocational guidance, J. R. Mathis, both of Miles City; professional education, L. F. Howard; professional development and constitution and bylaws, G. M. McCole, both of Great Falls; vocational guidance, Martha D. Nielson; public education on health and information and statistics, L. A. Crew, both of Billings; industrial and institutional services, W. F. Templeton, Harve; clinics, R. D. Wheaton, Helena; obstetrics, V. W. Wolf, Hardin; veterans, J. P. Campbell; M.O.A. membership, W. E. Dean, both of Bozeman; state and federal coordinator, C. L. Shafer, Jr., Helena; and legislative, D. M. Grewell, Billings, W. E. Monger, Dillon, L. C. Wilson, Chinook, C. G. Sundelius, Whitefish, C. W. Turner, Lewistown, Asa Willard, Missoula, E. S. Edwin, Great Falls, and Drs. Anderson, Howard, and Campbell.

NEW JERSEY

Essex County

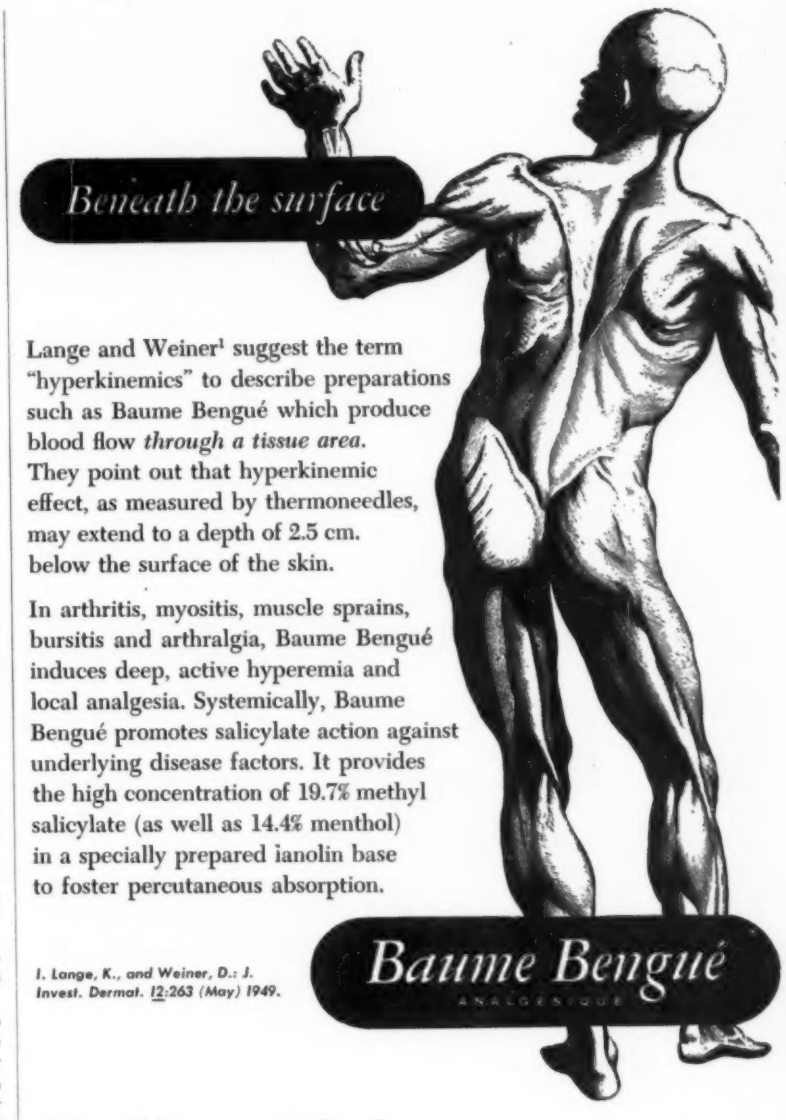
The officers are: President, Norman K. Sewall, Bloomfield; vice president, G. Randall Atkinson; secretary, Richard Feige (re-elected), both of Upper Montclair; and treasurer, John H. Beckman, Caldwell.

Committee chairmen are: Clinics, Edward H. Johnson, Montclair; and program, Dr. Atkinson.

NORTH CAROLINA

State Society

Department chairmen are: Professional development, Guy T. Funk, Winston-Salem; public health, Robert L. Johnston, Durham; internal affairs, Neva A. Mc-


Beneath the surface
Lange and Weiner[1] suggest the term "hyperkinemics" to describe preparations such as Baume Bengué which produce blood flow *through a tissue area.* They point out that hyperkinemic effect, as measured by thermoneedles, may extend to a depth of 2.5 cm. below the surface of the skin.
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1. Lange, K., and Weiner, D.: J. Invest. Dermat. 12:263 (May) 1949.
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Coy; legislative and judiciary, Thomas M. Rowlett, both of Concord; conventions and education, Elizabeth E. Smith, Asheville; public affairs and relations, Arthur M. Dye, Charlotte; and professional relationships, E. W. Bush, Southern Pines.

OKLAHOMA

State Society

The annual convention held in Oklahoma City November 5-7 is to include the following speakers: Robert D. McCullough, Tulsa; C. W. Dalrymple, Little Rock, Ark.; Clayton H. Morgan, Kansas City, Mo.; Robert P. Morhardt, South Pasadena, Calif.; Russell C. McCaughan, Chicago; and Don E. Ranney, Grosse Pointe Woods, Mich.

Other portions of the program are to be presented by the Oklahoma Radiologic Society and the Oklahoma Osteopathic Hospital Association.

Cimarron Valley

The officers are: President, Thomas A. Ryan, Drumright; vice president, Jack D. Wray, Oilton; and secretary-treasurer, Joe W. Hanson, Cleveland.

Chairman of the program committee is C. G. Ewing, Yale.

Eastern

The officers are: President, Ernest T. Ross, Okmulgee; vice president, C. D. Youngblood, Westville; and secretary-treasurer, Vernard W. Unruh, Wagoner.

Tulsa

The officers are: President, Frank J. Gasperich, Sand Springs; vice president, L. S. Van Valkenburgh; and secretary-treasurer, Crafton D. James, both of Tulsa.

TENNESSEE

Eastern

The officers are: President, Alberta Johnson, Chattanooga; vice president, Harold W. Roberts, Morristown; and secretary-treasurer, George G. Hall, Kingsport.

TEXAS

State Society Auxiliary

The officers are: President, Mrs. R. B. Beyer, Ft. Worth; vice president, Mrs. Emil Plattner, Grand Prairie; president-elect, Mrs. H. V. W. Broadbent, Austin; secretary, Mrs. R. J. Brune, Corpus Christi; treasurer, Mrs. J. R. Alexander, Houston; and corresponding secretary, Mrs. Gordon Beckwith, San Antonio.

Hospital Association

Speakers at the annual convention on August 31 were to be: H. Dale Pearson, Erie, Pa.; Mr. Alvin C. Knauss, Dallas; George J. Luibel; and Phil R. Russell, both of Ft. Worth.

District One

Clayton H. Morgan, Kansas City, Mo., spoke on "Diagnosis and Treatment of Poliomyelitis" at the August 10 meeting.

District Two

The officers are: President, C. E. Dickey; vice president, Jack H. Woodrow; and secretary-treasurer, Raymond Fisher, all of Ft. Worth.

District Six

The officers are: President, G. W. Thompson; vice president, Lester I. Tavel; and secretary-treasurer, Donald C. Young, all of Houston.

UTAH

State Society Auxiliary

The officers are: President, Mrs. Wilford Hale, Logan; first vice president, Mrs. Otto L. Anderson, Richfield; second vice president, Mrs. Leland Shaffer; and secretary-treasurer, Mrs. E. F. Waters, both of Salt Lake City.

WASHINGTON

State Society

The officers and trustees were reported in the September JOURNAL.

The committee chairmen are: Public affairs and osteopathic research, Perry C. Wilde, Seahurst; hospitals and clinics, Thomas I. Moore, Toledo; vocational guidance, Arthur E. Borchardt, Sunnyside; finance, Eugene D. Mosier, Puyallup; membership, Richard S. Koch, Olympia; bulletin editor, Einer Petersen, Tacoma; ethics and censorship, Francis D. Goddard; industrial and institutional services, Herbert G. Bauer; public health, Mary E. Gillies; national defense, A. S. Mackenzie; manual of procedure, Eugene E. LaCroix; convention program, Wilbert B. Saunders; parliamentarian, Arthur B. Cunningham; and "Welcome to Washington," Howard F. Kale, all of Seattle.

State Society Auxiliary

The officers are: Mrs. Charles M. Mitchell, Pasco; first vice president, Mrs. Arthur E. Borchardt, Sunnyside; second vice president, Mrs. Duane E. Johnson, Tacoma; and secretary-treasurer, Mrs. Clayton M. Schill, Seattle.

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WEST VIRGINIA

State Society

The officers and trustees were reported in the August JOURNAL.

Committee chairmen are: Ethics and censorship and public and professional welfare, Donald C. Newell, Oak Hill; membership effort, Joseph B. Bartram, Glenville; professional visual education, Charles S. McElroy, Follansbee; distinguished service certificate, W. H. Carr, Bluefield, and Robert E. Coda, Morgantown; research, E. E. Sieg; specialty groups, Benjamin Morris, both of Weirton; public relation, Rollo J. Morey, Parkersburg, and W. W. Wells, Mullens; progress fund, B. R. Kinter, Bluefield, and H. H. Cudden, Logan; state unit contact, A. B. Graham, Wheeling, J. C. Halley, New Martinsville, M. S. Boyes, Parkersburg, Roy Eshenaur, Pt. Pleasant, Harry E. McNeish, Elkins, R. B. Thomas, Huntington, W. B. Goff, Dunbar, Harwood James, Beckley, Guy Morris, Clarksburg, B. B. Courtney, Buckhannon, Theodore L. Sharpe, Martinsburg, Earl C. Hahn, St. Mary's, and Drs. Carr, Coda, and Newell; fact finding, Theodore H. Lacey, Parkersburg, Hoy E. Eakle, Hugheston, and Drs. Eshenaur and Guy Morris; professional liability insurance, Theron A. Titus, Martinsburg, and Drs. Lacey and Coda; A.O.A. membership, O. F. Carroll, Jr., Welch; finance, Preston Gandy, Clarksburg, and Drs. Graham and Guy Morris; budget, Edward D. Hersh, Weirton, and Drs. Morey, Wells, Gandy, Thomas, and Guy Morris; federal-state coordinator, Charles L. McDonald, Charleston; and refresher course and convention programs, Dr. Sharpe.

Bureau chairmen are: Professional education, Dr. Wells; professional development, Dr. Hersh; hospitals, John A. Matousek, Weirton; public education on health, Dr. Morey; public health and education (Public Health Council), Vernon E. Hoefer, Glenville; industrial and institutional service, Dr. Graham; and business affairs, Guy Morris.

Department chairmen are: Professional affairs, Dr. Thomas; and public affairs, Dr. James.

Plans for the midyear convention in White Sulphur Springs September 28-30 include: "Dysmenorrhea and Premenstrual Tension," "Diabetes Mellitus—Etiology and Symptoms," and "Role of the Adrenals in Body Defense Mechanisms," Claus A. Rohweder, Kirksville, Mo.; "Osteopathic Mechanics," A. B. Graham, Wheeling; and "Management of the Handicapped Child," Beryl E. Arbuckle, Philadelphia.

Ohio Valley

Charles S. McElroy, Follansbee, presented a paper, "General Principles of Symptoms with Indications for the Use of Cortisone," at the July 24 meeting in Steubenville.

WISCONSIN

Milwaukee District

The officers were reported in the August JOURNAL.

Committee chairmen are: Membership, W. A. Meyer; hospitals and clinics, Paul Atterberry; legislation, F. E. Hecker; industrial and institutional service, E. J. Marjan; public relations, Donald Lindley, all of Milwaukee; ethics, Robert Stocker, Oconomowoc; convention arrangements and public health, H. C. Bahling, Wauwatosa; and vocational guidance, R. W. Anderson, Cudahy.

SPECIAL AND SPECIALTY GROUPS

ACADEMY OF APPLIED OSTEOPATHY

Osteopathic Cranial Association

The officers are: President, George A. Laughlin, Kirksville, Mo.; president-elect, Rachel Hodges Woods, Des Moines, Iowa; executive secretary-treasurer, Kenneth E. Little, Kansas City, Mo.; and honorary president, William G. Sutherland, Pacific Grove, Calif.

The members of the executive board are: Anne L. Wales, Providence, R. I.; Harold I. Magoun, Denver; and H. G. Grainger, Tyler, Tex.

Puget Sound

The program planned for the meeting in Seattle on September 20 included: "Decompensation of the Heart and Associated Conditions," Arthur B. Cunningham; "Early Osteopathic Research and Its Application to Present Day Therapy," Martin D. Young; "Some Technics Shown at Atlantic City," Leanna Terry, all of Seattle; "Osteopathic Observations," George W. Eagon, Portland, Ore.; and "Cranial Osteopathy as Dis-

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cussed in Recent Literature," Thomas C. Herren, Kelso, and Mary Alice Hoover, Tacoma.

MICHIGAN OSTEOPATHIC SURGICAL SOCIETY

The officers and trustees were reported in the May JOURNAL.

Committee chairmen are: Statistics, Anton Kani, Trenton; vocational guidance, Verne H. Dierdorff, Wyandotte; and industrial and institutional service, D. F. Christman, Royal Oak.

MICHIGAN SOCIETY OF OSTEOPATHIC OBSTETRICIANS AND GYNECOLOGISTS

The officers are: President, Harold C. Bruckner, Clio; vice president, Howard E. Rohleder, Garden City; and secretary-treasurer, L. Linton Budd (re-elected), Carson City.

Trustees are: James G. Matthews, Highland Park, A. A. Speir, Merrill, and Roy Bubeck, Jr., Grand Rapids.

Committee chairmen are: Membership and credentials, E. J. Wagner, Detroit; hospital evaluation and minimum hospital standards, Paul A. Whitmore, River Rouge; policy, A. J. Still, Flint; editorial and publications, Dr. Bubeck; maternal mortality, Martin L. Riemann, Battle Creek; and postgraduate conference, Charles K. Norton, Royal Oak.

TEXAS SOCIETY OF OSTEOPATHIC SURGEONS

H. Dale Pearson, Erie, Pa., was scheduled to speak at the annual meeting in Fort Worth on August 30.

State and National Boards

ARIZONA

Basic science examinations December 16, at the University of Arizona, Tucson. Applications must be completed 2 weeks in advance. Address Herbert D. Rhodes, Ph.D., secretary-treasurer, Basic Science Board, University of Arizona, Tucson.

COLORADO

Basic science examinations December 3, 4, Lecture Room, second floor, YMCA Building, 16th and Lincoln Streets, Denver. Applications must be filed by November 19. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 18.

CONNECTICUT

Professional examinations November 11. Address H. Wesley Gorham, D.O., secretary, Osteopathic Examining Board, 520 West Avenue, Norwalk.

DELAWARE

Examinations January 13. Address Joseph McDaniel, M.D., secretary, State Board of Medical Examiners, 229 S. State St., Dover.

FLORIDA

Professional examinations November 29, 30. Applications must be filed by October 30. Address J. A. Camara, D.O., secretary, State Board of Osteopathic Medical Examiners, 209 Masonic Temple Building, Jacksonville.

HAWAII

Examinations January 14. Address Frank O. Gladding, D.O., secretary-treasurer, Board of Osteopathic Examiners, 504 Hawaiian Trust Bldg., Honolulu 13.

IDAHO

Examinations November 13 at Boise. Applications must be completed 15 days before exam. Address Mr. Britt Nedry, director, Bureau of Occupational License, Room 354, State House, Boise.

ILLINOIS

Examinations in January. Applications must be filed 10 days in advance. Address Mr. Charles F. Kervin, Superintendent of Registration, Illinois Department of Registration and Education, Medical Division, State House, Springfield.

IOWA

Basic science examinations January 13, in Des Moines. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

MAINE

Examinations November 11 at the State House, Augusta. Address G. F. Noel, D.O., secretary-treasurer, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

MASSACHUSETTS

Examination November 11. Address George L. Schadt, M.D., secretary, Board of Registration in Medicine, State House, Boston 33.

MICHIGAN

Basic science examinations in January at Detroit and Ann Arbor. Applications must be filed in advance. Address

Mrs. Anne Baker, secretary-treasurer, State Board of Examiners in the Basic Sciences, 423 W. Michigan, Lansing.

MINNESOTA

Basic science examinations January 6, 7, at Millard Hall, University of Minnesota, Minneapolis. Applications must be filed in advance. Address Raymond Bieter, M.D., secretary, Board of Examiners in the Basic Sciences, 105 Millard Hall, University of Minnesota, Minneapolis 14.

NEBRASKA

Basic science examinations January 13, 14, at the University College of Medicine, Omaha. Applications must be filed 15 days in advance. Address Mr. Husted K. Watson, director, Bureau of Examining Boards, Dept. of Health, Lincoln 9.

NEVADA

Examinations on January 13. Address Walter J. Walker, D.O., secretary-treasurer, Board of Osteopathic Examiners, 210 W. Second St., Reno.

NEW MEXICO

Basic science examinations December 21. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, P.O. Box 1522, Santa Fe.

NEW YORK

Examinations January 27-30, in New York, Albany, Buffalo, and Syracuse. Applications must be filed 30 days in advance. Address John W. Paige, M.D., chief, Bureau of Professional Examinations and Registrations, 23 S. Pearl St., Albany.

NORTH DAKOTA

Examinations in January. Address Gordon L. Hamilton, D.O., secretary-treasurer, Board of Osteopathic Examiners, Rongo Bldg., 119 S. Main St., Minot.

OHIO

Examinations December 1-3 in Columbus. Applications must be completed in advance. Address H. M. Platter, M.D., secretary, State Medical Board, 21 W. Broad St., Columbus 15.

OREGON

Professional examinations in January. Address Mr. Howard I. Bobbitt, executive secretary, Board of Medical Examiners, 609 Failing Bldg., Portland 4.

Basic science examinations December 6, Room 306, Lincoln High School, 1620 S. W. Park St., Portland. Applications must be filed in advance. Address Charles D. Byrne, Ph.D., secretary, State Board of Higher Education, Eugene.

PUERTO RICO

Examinations in March at San Juan. Applications must be filed 3 months in advance. Address Mr. Luis Cueto Coll, secretary, Board of Medical Examiners, Box 3717, Santurce.

RHODE ISLAND

Basic science examinations November 12, 366 State Office Building, Providence. Applications must be completed by October 30. Address Mr. Thomas B. Casey, Administrator of Professional Regulations, 366 State Office Building, Providence.

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Basic science examinations the first week in December. Address Gregg M. Evans, Ph.D., secretary-treasurer, Basic Science Board, 310 East 15th St., Yankton.

TENNESSEE

Examinations are held on the second Wednesday in February and the last Wednesday in July at Nashville. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland Ave., Jackson.

TEXAS

Examinations November 13-15, Menger Hotel, San Antonio. Applications must be completed 10 days in advance. Address M. H. Crabb, M.D., secretary-treasurer, State Board of Medical Examiners, 1714 Medical Arts Bldg., Ft. Worth.

VERMONT

Examinations in January. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Bldg., Rutland.

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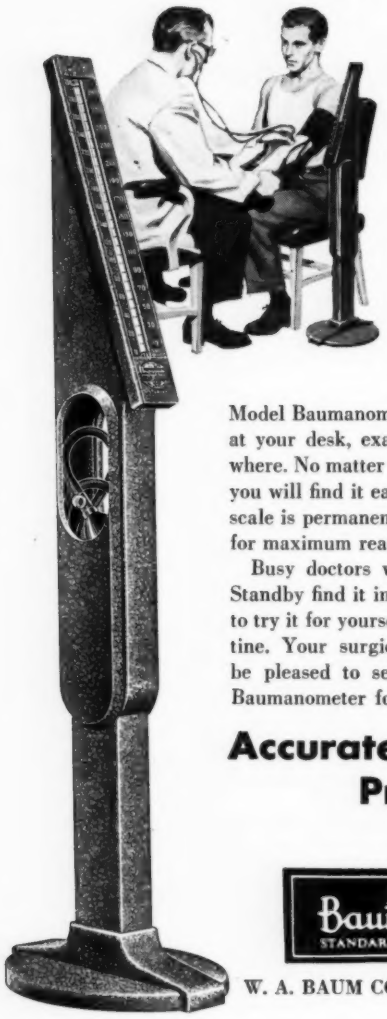

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Professional examinations January 13 at Madison. Address Alvin G. Koehler, M.D., secretary, State Board of Medical Examiners, 46 Washington Blvd., Oshkosh.

Basic science examinations December 6 at 8 a.m., at the Marquette University Medical School Auditorium, 561 N. 15th Street, Milwaukee. Applications must be completed by November 29. Address Professor William H. Barber, secretary, Board of Examiners in the Basic Sciences, Watson and Scott Sts., Ripon.

EXAMINATION BY NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary or the dean of the college, and the completed application blank, together with a passport photograph and check for the part to be taken, must be in the secretary's office by the November 1 or April 1 preceding examination.

Examinations in Part I consist of anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in surgery, including applied anatomy, surgical pathology, and surgical specialties; obstetrics and gynecology; pediatrics; neurology and psychiatry; public health, including hygiene; medical jurisprudence; osteopathic principles, therapeutics, including pharmacology and materia medica.

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REREGISTRATION OF OSTEOPATHIC LICENSES

November 1—Missouri, $2.00. Address F. C. Hopkins, D.O., secretary-treasurer, State Board of Osteopathic Registration and Examination, 203 South Sixth Street, Hannibal.

During December—District of Columbia, $2.00. Address Daniel L. Seckinger, M.D., secretary-treasurer, Board of Examiners in Medicine and Osteopathy, Commission on Licensure, Room 4130, Municipal Building, Washington, D. C.

January—Alberta. No registration. Pay $10.00 a year membership in College of Physicians and Surgeons, Alberta.

During January—Connecticut, $2.00. Address H. Wesley Gorham, D.O., secretary, Osteopathic Examining Board, 520 West Ave., Norwalk.

During January—Minnesota, $2.00. Address Wallace F. Kreighbaum, D.O., secretary, State Board of Osteopathic Examiners, 2933 Hennepin Ave., S., Minneapolis 8.

During January—Wisconsin, $3.00. Address Alvin G. Koehler, M.D., secretary, Board of Medical Examiners, 46 Washington Blvd., Oshkosh.

January 1—Arizona, not more than $10.00. Address Russell Peterson, D.O., secretary, Osteopathic Board of Registration and Examination, 2747 E. McDowell Rd., Phoenix.

January 1—California, $20.00 for residents and nonresidents. Address Glen D. Cayler, D.O., secretary-treasurer, Board of Osteopathic Examiners, 301 Forum Bldg., Sacramento.

January 1—Florida, $5.00. Address J. A. Camara, D.O., secretary-treasurer, Board of Osteopathic Medical Examiners, 209 Masonic Temple Bldg., Jacksonville.

January 1—Maine, $2.00. Address George F. Noel, D.O., secretary-treasurer, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

January 1—Manitoba, $5.00. Address W. Kurth, D.O., secretary, Board of Osteopathic Physicians, 248 Moorgate Blvd., Deer Lodge, Winnipeg.

January 1—New York, $5.00 biennially. Address Dr. John W. Paige, Chief, Bureau of Professional Examinations and Registrations, 23 S. Pearl St., Albany.

January 1—Ontario, $10.00. Address Mr. John C. Beer, secretary-treasurer, Board of Regents; Drugless Practitioners Act, 57 Bloor St., W., Toronto 5.

January 1—Oregon, $10.00. Address Mr. Howard I. Bobbitt, executive secretary, Board of Medical Examiners, 609 Failing Bldg., Portland 4.

January 1—Saskatchewan, $30.00. Address Doris May Tanner, D.O., secretary, Board of Osteopathic Physicians, 405 Sterling Trust Bldg., Regina.

January 1—Texas, $2.00. Address M. H. Crabb, M.D., secretary-treasurer, Board of Medical Examiners, 1714 Medical Arts Bldg., Ft. Worth.

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CURRENT METHODS OF COLLECTING STATISTICS OF HEALTH AND HEALTH PROBLEMS*

By Q. K. Sagen, Ph.D.†

The methods of collecting statistics relating to health and health problems are as multifarious as the subject of health itself. The extent and variety of health statistics are limited only by the resources available and the imaginations of those in this work. Although it is impossible to describe all statistical collection methods relating to health, an insight can be gained into what is going on and what may be done by classifying and outlining the principal sources of health statistics.

First, agreement is needed on what is meant by health and health statistics. The word "health" according to the dictionary means "state of being hale or sound in body, mind, or soul; especially freedom from physical disease or pain." The aim of public health efforts is to bring this salubrious state to the general population. The efficacy of the public health effort is evaluated by progress toward that goal. The role of public health statistics is to describe the current state of health, measure its improvement or deterioration, point out salient problems, and provide analytical material for evaluating and guiding the public health effort. Although this definition may seem excessively broad, it is necessary to adopt such a concept to encompass the field of present-day public health effort and its associated statistical collection methods.

Since the health of the individual is affected by his social and economic environment, public health statistics must include a considerable amount of information on the social and economic conditions of the people, as well as the biological aspects of their sickness and health. For this reason, the public health statistician needs to keep in close touch with, and have available, statistics on population, housing, employment, welfare, and related social conditions. These data are not collected and compiled by the public health statistician except as portions of social statistics draw upon data collected in health work, such as the vital statistics of birth, marriage, and death. The public health statistician has the responsibility of utilizing the statistics in these related fields by interpreting and applying them to health problems.

METHODS OF COLLECTING DATA

There are three distinct ways in which data for health statistics originate: (*a*) statistics compiled from returns and reports required by law, principally those of birth, marriage, death, and reportable diseases: (*b*) statistics derived from program activities and operation of

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†Dr. Sagen is chief statistician at the Illinois Department of Public Health, Springfield, Ill. This paper was presented before the Second Conference on Public Health Statistics of the School of Public Health of the University of Michigan at Ann Arbor, June 16.

health facilities; and (*c*) survey statistics from which data are gathered purely for the sake of the resulting statistical information. Also, some collections of data may represent a loose combination of types, for example, mobile X-ray screening in a tuberculosis program wherein a survey for statistical data is combined with a case-finding device in the operation of an antituberculosis program.

REPORTING BY LAW

Collection of statistics required by law has the advantage of legal authority to compel reporting, but it also has certain disadvantages for improving the administrative mechanism and changing the content of reporting. For example, the fact that the registration of births and deaths in many local areas is not in the hands of the health department is an administrative disadvantage. Even one State health department does not have birth and death registration responsibility. The disadvantage of legal specifications for statistical reporting is illustrated by the difficulty encountered with fetal death statistics. In order to extend the reporting to include all products of conception, it becomes necessary to amend the laws in almost every State.

In many instances, statistics originate in official licensure and regulation of various enterprises and occupations. The licensure of medical practitioners, nurses, and other health service occupations affords some statistical information on manpower resources in the field of health. However, more useful information arises from the licensure and regulatory activities over hospitals, nursing homes, diagnostic laboratories, and other institutions from which indications of illness can be obtained through required reporting. In the field of environmental health the licensure and regulatory function is the key to most of the information on the problems of environment. Notable examples are regulation of industrial health hazards; waste disposal; water, milk and food supplies; and housing sanitation. These services are often combined with a health service program, with the service aspect strengthened by the entree afforded by police power, while the law enforcement is facilitated by the persuasive aspects of useful service gratefully received.

PROGRAM DATA

The proliferation of health services, facilities, and programs in recent years has given emphasis to the development of health statistics and to routine reporting of the statistical data. The administration of the services requires systematic record keeping which in turn generates statistical data. Compilation and analysis of these statistics become essential in administering, evaluating, and operating the projects, and here the official and nonofficial agencies share common problems. An example is the tuberculosis X-ray screening program in which the voluntary tuberculosis association conducts surveys side by side with the official health department. In this situation the statistics of the activity assume added importance because they provide the basis for coordinating twin efforts which cannot be allowed to clash or to duplicate and overlap each other. In other cases, the voluntary agency will operate the screening venture and the official agency will do the follow-up. Here again, the statistics provide an indispensable link in keeping the project in alinement and in balance.

The operation of health services—to people, to lower animals, or to environmental elements—brings out two competing demands for statistics. On one side is the need for statistics in the administrative work of planning and operating the projects, while on the other the so-called clinical or research statistics are needed to evaluate methodology and reveal new knowledge on the subject of the service. Since competent statistical work is expensive, the resources often are not sufficient to provide both kinds of statistics for the project, and a large amount of data arising out of health service operations is collected but not used, or is improperly handled. Another factor is the shortage of biometricians for work in the health sciences. Despite these limitations important statistical work is being done in the various health services, and utilization of the statistics is on the increase.

The phrase "health services" is used here to embrace the whole area of preventing, mitigating, and remedying disease, disability, and injury. Even this is not sufficient when we think of sources of health statistics obtainable from various insurance plans designed to mitigate

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economic loss to individuals due to sickness, disability, or death. Life insurance statistics for a long time furnished about the only source of consistent information covering illness and disability for a large part of the population. The experience of the hospitalization insurance and medical care plans has now been added to this source. In these activities, the gathering of health statistics comes as an essential by-product of the operating records for the enterprise.

As stated earlier, the salient characteristic of the statistics from health services is that the statistical data are derived by a systematic handling and processing of the records used in operating the service. Good records are essential to efficient operation, as well as to reliable statistics. This becomes apparent the larger the service grows and the longer it operates. Health departments have encountered this fact in their experience with case registries for tuberculosis and cancer. However, we must keep in mind that there is a tendency toward overelaborate statistics from clinical data. A mass of unmanageable data results from trying to assemble every scrap of information. Clinical data are best utilized for specific research studies, with limited objectives carefully planned in advance of collecting the information.

The majority of health statistics arise from cross-sectional data on conditions as they exist at a particular time. Cross-section statistics fail to reveal what goes on in the never-ceasing process of change in people and in their conditions. Studies based on longitudinal data fill that gap by following the course of events in the same group of individuals through repeated observations over a period of time. Fruitful sources of longitudinal data are the health services given for chronic diseases such as cancer, for chronic or recurrent infections such as tuberculosis, venereal disease, and rheumatic fever, and for impairments such as those due to poliomyelitis, premature birth, and dental caries. Also, of equal if not of greater importance are longitudinal studies on persons who are apparently well at the outset. Compared to cross-sectional studies, longitudinal studies are costly if they are made only to complete follow-up. Indiscriminate enthusiasm for longitudinal studies has stimulated too many duplications of effort. For example, it should not be necessary to conduct identical follow-up studies in all cancer programs over the country, yet at one time this procedure was seriously advocated for cancer registries.

Emphasis is now given to obtaining statistical summaries of services provided by health departments, particularly in local health departments which want to know what each of their programs is doing. Many local health departments are keeping count of nurses' visits, of the number of children served by well-child conferences and in school health programs, the number of immunizations given, sanitary inspections and services rendered, and other activities of the local health department. Administrative data of this kind have appeal but are not as useful as they should be since the attempt has been to cover too much territory. The problem of how to use such data effectively in evaluating local health programs is undergoing investigation.

The mass of statistics that can arise from conducting health services and programs makes it important that health agencies exercise discrimination in planning statistical work. The primary necessity is to plan how much statistical work will be needed to operate the program effectively and to furnish a simple evaluation of its effectiveness. A decision is needed on what and how much research is to accompany the program and on what the potentialities are for learning something that is both significant and new. This is the joint responsibility of the program director and the health statistician.

SURVEY STATISTICS

The survey method of obtaining statistics is the oldest of the three approaches discussed here. In the United States the earliest comprehensive survey was the Federal census of population in 1790. The object of the survey method is to obtain cross-sectional information on the distribution of certain carefully defined characteristics in a population, which may be animate or inanimate, human, or any other species of fauna or flora. For a long time the survey method was restricted to a complete enumeration of the population under study. As a result of the development of statistical

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theory, we now have techniques for obtaining valid information characterizing an entire population by enumerating only a part of it. These statistical sampling methods are advantageous because of the relatively low cost at which reliable facts can be learned about a large population. The technique also furnishes information on the degree of precision which can be safely attached to the statistical results. Extending the use of sampling surveys will open a veritable gold mine of knowledge on health conditions. So far, the most notable health study of this kind is the National Health Survey of 1935-36.

The various mass-screening techniques for tuberculosis, heart disease, diabetes, and syphilis; for dental, hearing, and eyesight defects; and for other diseases conducted individually or in combinations as "multiphasic" screening, provide challenging methods for making observations of large groups of the population. The principal object of screening has been case finding and health education so that early diagnosis can lead to early remedial treatment for as many as possible. Statistically, the value of findings in such surveys has not been as useful as desired because the screening applications have been only incidentally designed to yield statistics. If screening projects were conducted so that statistical sampling techniques could be applied, the data would yield information on distribution of the defects surveyed in the general population. Nevertheless, valuable data have been assembled through these screening processes.

It would be futile in anything short of a textbook even to list all applications of survey methods in health statistics. The Public Health Service has perhaps done more of this work than all other health agencies combined. Perusal of a file of *Public Health Reports* for recent years will provide a fairly comprehensive bibliography of the various situations to which survey techniques are being applied.

QUANTITY AND QUALITY

The sources of statistics sketched are sufficiently comprehensive to indicate that there is no dearth of data on health as far as quantity is concerned. Current methods of collecting health statistics tend to emphasize quantity above quality. Part of this emphasis is due to the conditions which health statistics are called upon to describe and the large populations among which such conditions exist. An unfortunate circumstance is that statistics too often connote mere aggregates of numbers in tables in which one can search for and find an interesting numerical "fact." Throughout the country health statistics as a whole still suffer from much poor handling of data. Insufficient precautions in assembling data, improper processing, and unskilled analysis produce unusable and misleading "statistics." Year by year we are seeing improvement as the users of health statistics become better informed and as the statistical personnel in health work become more proficient.

State-Federal cooperation is doing much to improve the quality of State and national vital statistics. Current vital data are of a higher and more uniform quality throughout the entire country than ever before in history. The striking increase in the completeness of birth registration for the last decade bears witness to some of this improvement. (*1*)

Health statisticians generally are getting sharper tools and learning how to use them. Great strides have been made in obtaining more uniform and precise methods of classifying original data, which is the first and most critical step in compiling statistics. The general adoption of good classification standards means that our health statistics all speak the same language. The greater use of mechanical equipment and the development of new machines expressly for processing statistical data have shortened the processing time, brought about greater numerical accuracy, and permitted statistical analyses which hitherto have involved too much labor.

The mechanical aids and improved compilation methods do not reduce the need for solid thinking in producing statistics. The object of the entire statistical process is to produce useful conclusions on health problems, conclusions that are valid and simply expressed. This represents an intellectual exercise that cannot be avoided. Current statistical practice applied to health data needs to give greater recognition to this principle if it is to utilize fully and properly the material already available in such abundance.

REFERENCE

(1) Shapiro, Sam, and Schachter, Joseph: Birth registration completeness, United States, 1950. Pub. Health Rep. 67:513-524 (1952).

PUBLIC HEALTH AND MEDICINE AT THE CROSSROADS*

By Herman E. Hilleboe, M.D., M.P.H.†

In these days of disorder, change, and impending disaster, we who are dedicated to the health and welfare of the people face tasks of greater challenge than we have ever known before. We have arrived at a stage in our social development, whether desirable or not, at which the people turn to us increasingly for aid and guidance. This is a grave responsibility. Under its burden and facing its humane demands, we are compelled to review the adequacy of our guiding principles.

Public health is at the crossroads. We must now choose the direction that we shall take in the future, or it will be chosen for us.

The concept of health department services to the people has undergone dramatic change. Advancing medical knowledge and public health activities have sharply decreased morbidity and mortality from the communicable diseases. Improved working conditions, better nutrition, more attention to preventive medical services in the schools, and similar social forces have contributed to improved health and welfare. Environmental sanitation programs are well on their way. Means have been provided and successful methods have been developed for the expansion of environmental health activities.

It is plain that, in the future, the theory and practice of public health must be expanded to include a vigorous attack upon the chronic diseases, with special attention to heart disease and cancer, which are the principal killers and disablers in our Nation.

We need new knowledge, new methods, and new measurements for evaluating our programs. As the demands of communicable disease control continue to decrease, we must utilize our acquired skills in combating the ravages of the chronic diseases, an increasingly crucial problem for the private practitioner and the public health physician.

DEATH RATES: NEW YORK

Where do we stand in New York State? The 1951 death rate from all causes in the State was 10.5 per 100,000 population. The death rate has never been lower. In 1940 the rate was 11.1. The degree of improvement is greater than these figures indicate. In the last decade the proportion of older persons, among whom mortality is inevitably high, has increased. Had the age distribution of the population in 1951 been the same as in 1940, the death rate would have been 9.2 instead of 10.5.

Infant mortality, 23.7 per 1,000 live births, was the lowest ever experienced and represents a drop of 36 percent since 1940. In the same interval, neonatal mortality decreased 28 percent, while that between 1 month and 1 year dropped 55 percent. Maternal mortality, 4.9 per 10,000 live and still births, also dropped to a new low record and was less than one-fifth of the rate in 1940.

New low levels were reached in 1951 by deaths from streptococcal sore throat (including scarlet fever), whooping cough, and diphtheria. Deaths from streptococcal sore throat numbered 21 as contrasted with 107 in 1940. Deaths from whooping cough numbered 11, while in 1940 there were 138. Only two deaths were attributed to diphtheria; the previous low mark of nine occurred in 1944.

Among the diseases to which all ages are subject, the death rate per 100,000 population for 1951 in New York State, including New York City, was 4.0 for syphilis and 23.5 for tuberculosis. The death rates for these two human scourges were lower than ever before in our history. Indeed, the tuberculosis death rate for 1951 showed a drop of 9 percent over that of the preceding year and was 50 percent less than the rate in 1940. In this 11-year period, the tuberculosis death rate in New York City dropped 46 percent—from 54.4 to 29.5. In the rest of the State, the reduction was 50 percent—from 33.7 to the 1951 rate of 16.7.

Contrast these low rates with the awesome death rates of 184.4 from cancer and 459.8 from heart disease. To state

*Reprinted from *Public Health Reports*, August, 1952.

†Dr. Hilleboe, commissioner of health for the State of New York, presented this paper at the first general session of the forty-eighth annual health conference of the State of New York, at Lake Placid, June 4, 1952.

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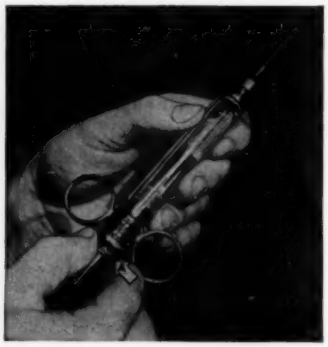

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them another way: 43 of every 100 deaths in upstate New York were due to heart disease; 17 out of every 100 deaths were due to cancer; and 11 out of every 100 deaths were from intercranial lesions of vascular origin. It is estimated that 1 out of every 20 persons in the United States suffers from some disorder of the cardiovascular system; every other death after the age of 45 years is caused by heart disease.

CARDIOVASCULAR DISEASES

Public health epidemiology has made distinct contributions in the field of the cardiovascular diseases. The causes of beriberi, scurvy, and pellagra were elucidated almost solely by epidemiological methods — these methods contributed much to the understanding and prevention of heart disease associated with nutritional deficiencies. Again, the aggregation of rheumatic fever in families and the probable importance of hemolytic streptococcal infections in precipitating heart attacks were discovered largely by epidemiological studies.

In spite of these memorable advances, we seriously lack epidemiological knowledge of many types of cardiovascular disease. Our information concerning the prevalence of cardiac ailments is limited to selected fractions of the population. The causes of atherosclerosis, hypertension, and rheumatic fever are still unknown. Epidemiologists would be greatly aided in their study of the etiology and demography of cardiovascular diseases if public health workers could devise and test mass methods of screening the adult population for these diseases. Their use in large population groups would give us valuable data on the extent of the problem, and would enable us to bring large numbers of early cases under the supervision of family physicians.

SECONDARY PREVENTIVE SERVICES

Research is being intensified on a broad front to find preventive measures that will help people to avoid heart disease. While this type of fundamental research is being pursued, we can use other approaches to the control of heart disease by strengthening our secondary preventive services. These are directed at the earliest detection of asymptomatic heart disease and the detection of early disease, so that the progression of clinical symptoms may be halted and further damage to the cardiovascular system avoided or minimized.

It is in this field of secondary prevention that health departments can make significant contributions. It is not enough to offer postgraduate courses for physicians, to develop nutritional weight control programs for the obese, or to acquaint the public with the problems of heart disease by means of the techniques of health education. If we are to assault the chronic diseases with the same vigor and success with which we attacked the communicable diseases, we must employ epidemiological methods in the exploration of these new fields. With only a few minor exceptions, we don't know how much heart disease there is in our communities. We do not know what types of heart disease are prevalent; nor do we know what types can be benefited by early detection. For atherosclerosis and coronary disease, we have no accurate mass case-finding methods.

Where, then, do we start and what do we do? There are two approaches that can be used by any health department large enough to employ full-time public health physicians and with courage enough to explore uncharted fields in public health.

Athero-coronary disease is the major contributor to death in the cardiovascular group. The various tests used to detect it early have not been evaluated either as to their relative efficiency or mass applicability. However, such studies can be undertaken by any large health department that can obtain random samples of the adult population at risk, and that has both the equipment needed for a battery of tests and the necessary professional and technical staff to perform and evaluate the tests.

This is a formidable task, but so was the early detection of syphilis and tuberculosis. It is better to spend the next few years in the determination of the reliability, validity, yield, cost, and acceptability of screening methods for coronary disease than to wait and muddle through with whatever might be available in the distant future.

Public demands for heart disease control programs are daily gaining momentum. It is inevitable that we will find

new screening methods as we test the old, discard the inefficient, and develop those that single out most efficiently the potential and real, though obscure, cases.

Since early this year the New York State Health Department has had a small study group working on this approach to the problems of coronary disease and hypertension. We will launch our program on a group of several hundred key personnel in our State government in the age groups over 40, in which coronary disease and hypertension death rates are high.

We intend to seek out the most effective methods of detecting coronary insufficiency before occlusion or hypertension or cardiac hypertrophy occur. As soon as we achieve adequate information concerning mass screening methods and have accurate knowledge of the groups most at risk, we shall extend our activities to a full-scale community program, with the close cooperation of health departments, private practitioners, and medical schools.

PUBLIC HEALTH APPROACH

Those of us over 40 years of age have a personal as well as a professional interest in the public health approach to cardiovascular disease. Blumgart (1) found that among several hundred persons over 40 who died of noncardiac causes and who had shown no evidence of heart disease, 40 percent exhibited on autopsy considerable hardening and narrowing of the coronary arteries. I urge initiation and pursuit of specific epidemiological studies.

The second approach to the problem of heart disease can best be made by county and city health departments because of their proximity to the sufferers from heart disease who will be needed for such studies. Specifically, I refer to the several hundred thousand chest X-ray films taken each year for the purpose of tuberculosis case finding. Rutstein, Williamson, and Moore (2), in their Boston study which was reported in November 1951, have clearly demonstrated that it is possible by means of 70-mm. photofluorographic film to identify in the general population a significant number of persons who have previously unknown heart disease. To be sure, skilled cardiologists must reread the films. When this is done, three times as many abnormal hearts are found as when less-skilled film readers review the films. In addition, persons with abnormal hearts must be referred to clinicians and followed up by their private physicians.

Here is an extraordinary opportunity for the health officer to initiate cooperative activity of major importance between the health department and the medical profession. Great benefits will accrue to thousands of cardiac patients in terms of productivity, personal happiness, and prolonged life.

Rutstein and his colleagues (2) point out that all newly discovered cases of rheumatic fever were benefited, because they learned to avoid further exposure to streptococcal infection and subacute bacterial endocarditis after operation or tooth extraction. In addition, many heart patients were more amenable to the techniques of vocational rehabilitation. Similarly, newly discovered cases of hypertensive or arteriosclerotic heart disease with auricular fibrillation, angina pectoris, and marked obesity certainly could be benefited by prompt referral to medical care. There was also a miscellaneous group of cases — congenital syphilitic, thyrotoxic heart disease, and pericardial tumors—that were greatly improved by medical or surgical therapy.

PRIVATE PHYSICIAN BENEFITED

Such case finding through mass surveys of well people will enable the private physician to see patients in the asymptomatic stages of their disease, when therapy has its greatest effectiveness. Moreover, public health activities in this field will supplement the practicing physician's case finding in his office. This is just one example of the kind of epidemiological work local health departments can conduct successfully.

PRIORITY FOR CHRONIC DISEASES

The impersonal numbers on the mortality tables cannot convey the tragic stories of human suffering and family disruption that follow in the wake of crippling attacks of heart disease. The magnitude of the problem gives high priority, on the agenda of the health officer, to cardiovascular disease study and control.

Similar epidemiological studies should be undertaken in the field of cancer. Such an enterprise will also demand the active cooperation of the practicing physician and the public health worker.

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In attempting to conquer heart disease, cancer, and the other chronic diseases, it is essential that we enlarge the scope of coverage and the number of services which the medical profession and public health agencies can provide. In New York State, we have been for years keenly aware of the necessity of providing medical care for the indigent, and we can boast of the best medical care program for welfare recipients of any State in the Nation.

To make medical care for the indigent even more certain and universal, the New York State departments of welfare and health recently took a significant step forward in cooperative governmental endeavor. The State health department established the new position of assistant commissioner of health (for welfare). One of our key public health administrators was assigned to the Department of Social Welfare to develop and evaluate the medical care program for recipients of public assistance. It is a unique arrangement in government. The new assistant commissioner is responsible to the commissioner of health for professional guidance and has full access to all the information and facilities of the State health department; administratively, he is responsible to the commissioner of social welfare in whose department his office is located.

These medical care programs for more than 3 million persons are locally administered and use the facilities, services, and personnel of both the public and voluntary medical agencies and institutions. Through local hospitals and dispensaries, approximately 850,000 persons receive medical care annually at a cost of $106,000,000. Through local public welfare agencies, 250,000 needy sick persons are cared for at home and in doctors' offices at a yearly expenditure of more than $6,000,000 in public assistance funds. We have an unequaled opportunity to integrate preventive services of health departments into curative services of welfare departments.

Through this interdepartmental cooperation, private physicians, public health and welfare officials, nurses, social workers, rehabilitation specialists, and many others will be working together in an integrated, sustained effort to restore to health and to useful community roles thousands of the diseased and disabled whose impairments have reduced them to economic and social dependency.

It is by means of such cooperative enterprise that we may make a beginning toward the achievement of our high goals. By such realistic teamwork we can conserve efforts, personnel, and funds, and we can measure and surmount the barriers which daily we encounter in our work.

PHILOSOPHICAL MERGER NECESSARY

Public health agencies cannot do these gigantic tasks alone. It will require the cooperative efforts of the whole of society. Particularly will it require a philosophical merger of the policies of medical societies and public health agencies. Clinical medicine is becoming increasingly aware of its role as a social instrument, and public health practice is perceiving more keenly the problems of the individual in his relation to the family and the community in which he lives and works. But we need a closer working arrangement before we can be effective in controlling heart disease and cancer.

Lest it be feared that by working closely with official public health agencies the medical profession will suffer a loss of freedom, it should be said that complete freedom is not necessarily the natural state of human beings in a crowded society. It is something that can be obtained only within natural limits by continually clearing away obstructions. In seeking freedom in a medical field or profession, it is not enough to say that we want special privilege and the license to do what we like. We must answer the question, "Freedom for what?"

What we seek is freedom to serve. To be sure, the practicing physician should have every freedom in the exercise of his judgment in the care of his patients. Much of the value of medicine rests on the willingness of sincere physicians to spend unlimited time and effort because they feel responsible for the patient's life and happiness. When this personal feeling is artificial or absent, the work of physicians descends to a low level of effectiveness.

We ought to strive for and insist upon two things that can be coexistent—professional freedom and professional re-

sponsibility. Properly viewed, the work of the whole medical profession, which includes public health, is not done in our private interests but in the interest of the community.

With this broad view of professional freedom and responsibility, the private physician and the public health physician can serve the individual and the community to best advantage by working together. They must not be driven by a desire for personal gain alone, but by a willingness to serve the common good. The breadth of this concept emphasizes the scope of action in which all members of the medical profession should participate. Without such a wide horizon, we shall become ingrown and isolated from the dynamic trends of social evolution.

If we are to achieve this common objective of professional cooperation, it is vital that the medical profession, which holds a key position in the social order, close its ranks and that public health and private physicians contribute their full quota to the common effort. We must be prepared, while retaining the best of our traditions, to adjust our efforts to the changing conditions in society.

Medicine changes with time and place, and we must keep abreast of these changes. This will require mutual understanding and faith and trust. The result will be a fuller appreciation on the part of the public health worker of the problems of the general practitioner, plus enlightened awareness on the part of the clinical physician of the responsibilities and special attributes of the public health physician.

We stand at the crossroads. We must take new direction and answer the medical and social questions posed by the chronic diseases as we continue to carry the burdens of our regular work. With courage and with faith in the creative mind of man, we shall succeed.

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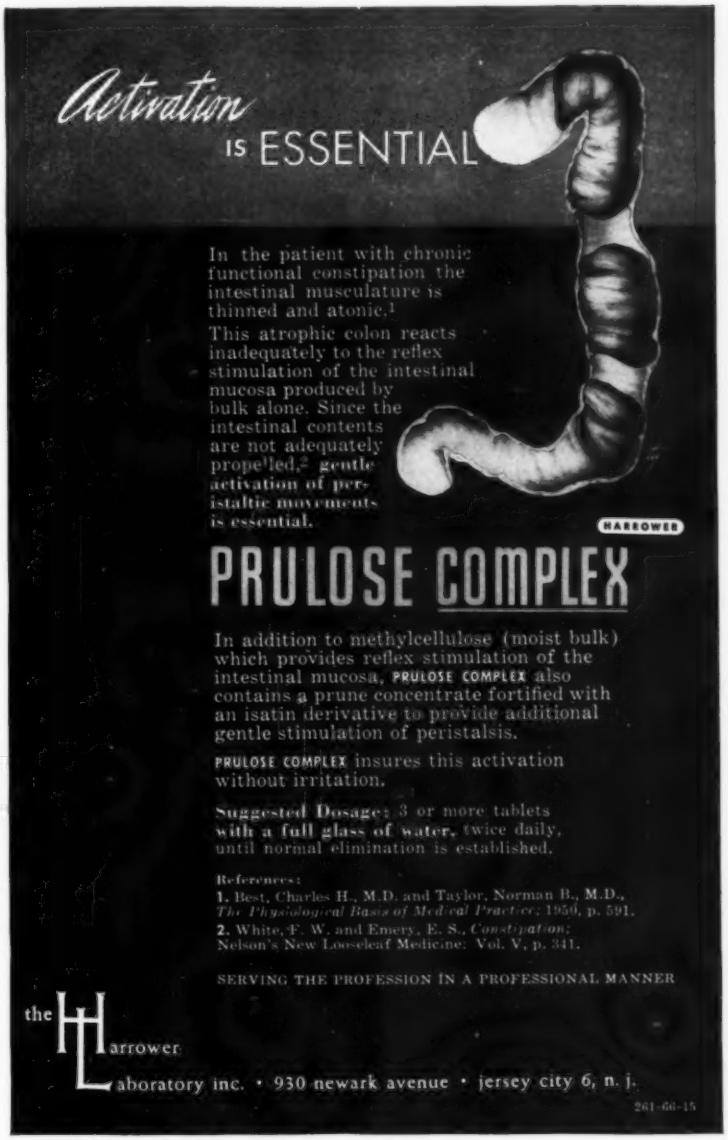
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PUBLIC HEALTH PROGRESS

While the battle for public health progressed markedly during 1951, and the lowest death rate in the Nation's history was recorded, the year's end found 40,000,000 Americans still without the protection of full time local health services, according to the annual report of the Public Health Service made public by Federal Security Administrator Oscar R. Ewing.

Only half of the 3,070 counties of the United States are served by public health departments, the report states. Another 550 counties receive advisory and supervisory services from some sixty State health districts.

State programs placed increased emphasis during the year on the prevention and control of chronic diseases. Control programs for cancer and heart disease received particular attention. Control activities in other chronic disease problems such as diabetes, arthritis, and rheumatism also moved forward in many areas.

Research in chronic disease kept pace with the expansion of control measures. Important investigations in heart disease research centered around the major problems of rheumatic fever, hardening of the arteries, and high blood pressure.

Progress also is reported in cancer research, in mental health research and in dental research. To promote more extensive research in other fields, two new institutes were established during the year, the Institute of Arthritis and Metabolic Diseases and the Institute of Neurology and Blindness.

Construction of the new Clinical Center building was reported 59 per cent completed at the close of 1951. The center, which will be ready for occupancy in 1953, will give the National Institutes of Health, the research arm of the Service, its first opportunity to conduct clinical research on a wide scale.

The Public Health Service is greatly concerned with health problems related to the National emergency. Among projects undertaken in this area during the past year were the development of a plan for the rapid detection and reporting of disease epidemics, the study of the effects of radioactive wastes on water uses, and special training in radiological health.

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The Service has also responded to increasing demands for advice and counsel on health matters, for the loan of experts for defense activities, and for the staffing and conduct of special projects. However, the special health problems of the emergency cannot be considered distinct in themselves. Rather, coupled with the continued development of the Service's regular activities, they will add momentum to the steady increase in health gains which the Nation has enjoyed in the past 50 years.

The health status of the average American continues to be strengthened, according to the report. The death rate for 1951 was 9.6 per 1,000 population, 10 per cent lower than in 1940. The average life expectancy at birth has risen to 68 years, compared with 47 at the turn of the century.

The infant and maternal mortality figures, illustrative of the importance of improved health services and medical care, dropped to the lowest point ever recorded in the United States. Infant mortality has fallen from 100 per 1,000 live births in 1915 to an estimated 20 per 1,000 in 1950. Maternal deaths dwindled from 57 per 10,000 live births to an estimated 7 last year.

New gains were reported in the fight against some of the communicable diseases. The death rate from tuberculosis dropped to 22 per 100,000 population, about 50 per cent lower than the rate 10 years ago.

Less syphilis was reported in 1950 than in any year since 1929; and less gonorrhea than at any time since 1942. The 33,209 cases of poliomyelitis in 1950 represented a 21 per cent decrease over the all-time high of 1949. Only 42 cases of smallpox were reported during the year.

With the increased numbers of persons living longer, the chronic diseases, however, are taking a greater toll. Diseases of the heart and cancer caused two-thirds of all deaths in 1950.

The advances toward longer and healthier American lives have been brought about by medical research, expanded hospital facilities and improved

local health services, the report pointed out. During the past year all 53 States and Territories surveyed their hospital resources and reported that there are now slightly more than 1 million hospital beds available. There was an increase of 142,000 beds during the year, half of them constructed with assistance under the Hill-Burton program administered by the Public Health Service.

THE TUBERCULOSIS PROBLEM*

By Russell E. Teague, M.D.†

In almost all of its aspects, the rapidly changing picture of the tuberculosis problem in the United States presents one of the most profound sociobiological phenomena, if not the most interesting development, in the entire field of medicine and epidemiology. It is significant, if not paradoxical, that, as many aspects of the disease decline or diminish at an accelerated rate, the program for control continues to expand.

DECLINE IN INFECTION RATE

Results of tuberculin tests of sample populations in Philadelphia in 1949 seem to indicate that today individuals are being infected with the tubercle bacillus at an average rate of less than 1 percent per year, or one new tuberculosis infection per 100 person-years of life.

Data from three studies at the Henry Phipps Institute in Philadelphia bear out this observation. In these studies, children in three large high schools were tested at 10-year intervals—in 1929, 1939, and 1949. In 1929 the average rate of conversion to the first test dose of tuberculin was 5.3 per 100 person-years; in 1939, this rate was 2.7; and in 1949, less than 1. At the average age of 16 years, in all three studies, the percentages of children who were positive to the first test dose of tuberculin were: 1929, 84 percent; 1939, 43 percent; and 1949, 16 percent.

If conversion to the first test dose of tuberculin indicates acquired tuberculous infection or exposure to the tubercle bacillus, the average individual living in Philadelphia under the 1929 rate would have had a new experience with the tubercle bacillus at least three times during his life, whereas if he had lived under the 1949 rate, the chance that he would not be infected at all would be about 50 percent.

It is being recognized and widely accepted that evidence of infection—a positive tuberculin test and especially a recent conversion—becomes more helpful and significant today than in the past.

*Reprinted from *Public Health Reports*, August, 1952.

†Dr. Teague is secretary of health, Commonwealth of Pennsylvania. This paper was presented before the forty-eighth annual meeting of the National Tuberculosis Association in Boston, May 27, 1952.

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MORBIDITY

A compilation and preliminary analysis of tuberculosis reports from the States, recently prepared by the Division of Chronic Disease and Tuberculosis of the Public Health Service, provides a source for morbidity data for 1951.

According to this report, 118,414 new cases were reported in the United States in 1951. Although this figure may not be final for the year, it represents a decline of less than 3 percent from the number reported for 1950, and 12.3 percent from the 1947 total. The average annual decline in reported cases since 1947 is 3.07 percent per year.

In view of the intensified case finding during this period, these data are encouraging. The reported case rates for the white and the nonwhite cases were 68.1 and 165.3 per 100,000 population, respectively. For white and for nonwhite males the respective rates were 86.6 and 194.8; for white and for nonwhite females, 49.9 and 136.1.

There were four new cases reported in 1951 for each tuberculosis death reported, an improvement in the ratio when compared to 2.8 cases per death in 1947, 3.1 in 1948, 3.4 in 1949, and 3.6 in 1950. The case-death ratio remains higher for whites than for nonwhites and higher for females than for males.

MORTALITY

In 1950 there were 33,577 deaths from tuberculosis, or 2.3 percent of the total deaths from all causes for that year. Compilations of the total number of deaths reported for 1951 have not been completed, but, based on a 10-percent sample study made by the National Office of Vital Statistics, Public Health Service, the decline in the number of deaths from tuberculosis from 1950 to 1951 was about 11 percent for the country.

The number of deaths from tuberculosis, as well as evidence of infection and morbidity, is dropping faster in the younger age groups and in females than in older males. In 1952, 75 percent of the population of many sanatoriums were males, most of them in the advanced age group.

LONGEVITY OF PULMONARY TUBERCULOSIS PATIENTS

My recent life table study of the longevity of all clinic patients diagnosed as having active tuberculosis at the Henry Phipps Institute in the 20-year period between 1926 and 1945 indicates that the average longevity of these patients is 5.9 years. While the whites

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lived 11.2 years, the average length of life of the nonwhites was 3.5 years.

The cases diagnosed in the minimal stage averaged 25.1 years of life after diagnosis, those in the moderately advanced stage, 9.9 years, while those diagnosed in the far-advanced stage averaged only 1.1 years.

There was no difference in the case fatality rates when the number of cases in the first 10-year period was compared with those in the latter 10-year period. With recent improvements in therapy, however, marked improvement in the case-fatality rates of the patients diagnosed in 1952 would be expected.

Despite the improved picture of the disease, activities directed toward meeting the problem continue to increase.

CASE FINDING

In 1951, reports indicate that about 13,000,000 chest X-rays were made by States and by the agencies reporting to them. This amounts to 8.2 percent of the total population of the country. In three States the number of X-rays taken amounted to more than 20 percent of their population last year.

Recent studies on familial susceptibility and resistance emphasize the importance of heredity in epidemiology and point out that in the future case finding may very well be directed toward continued medical supervision of the blood relatives of known cases, wherever they may reside.

ISOLATION AND TREATMENT

Since the prevention of this disease is directly proportional to the number of patient-days of effective isolation, it is encouraging that more beds are becoming available each year for tuberculosis patients. More chest surgery and chemotherapy should eventually result in shorter periods of hospitalization and thereby permit more beds for more patients.

The problem of isolation of the "good chronic" patient has not yet been solved in most areas, and agencies and health administrators are concerned with this problem to an increasing degree.

The management of the recalcitrant infectious patient is being met in many areas by compulsory isolation procedures, and there is evidence of more widespread application of these techniques.

Public health administrators and sanatorium superintendents are plagued with a shortage of personnel, especially nurses, and the trend toward using nonprofessional aides is increasing.

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culosis research is heartening. Barring a national catastrophe, it is not illogical to assume that in one more generation the "great white plague" will no longer be a major public health problem in the United States, but this does not mean that we can ever relax our vigilance.

On the other hand, the prevention program must be intensified. Then education of the layman will be more difficult and it will cost much more to find the unknown case, but there will be less expense for tuberculosis hospital beds, and more institutional space will be available for isolation of the "good chronics" that remain. More attention will be paid to the hereditary factors in infection. Greater efforts will be given to preventing the entry of tuberculous patients from parts of the world where high rates prevail, and concern may be expressed about the danger of our unexposed, tuberculin-negative population even visiting in areas of high infection. This concern may not be justified and only further studies will give the answer.

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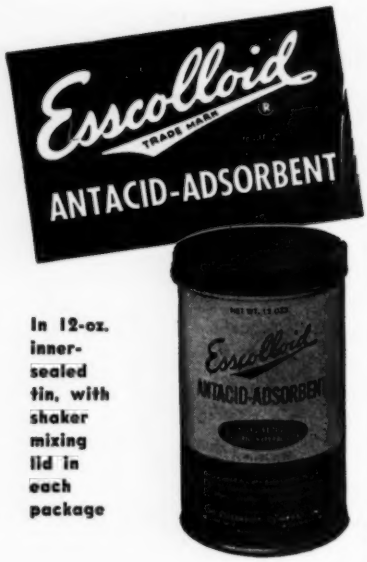

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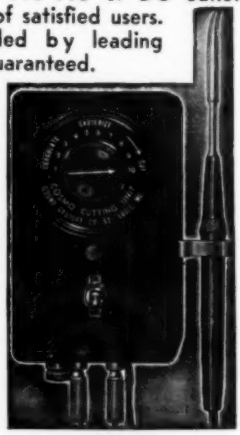

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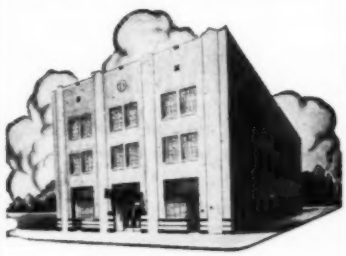

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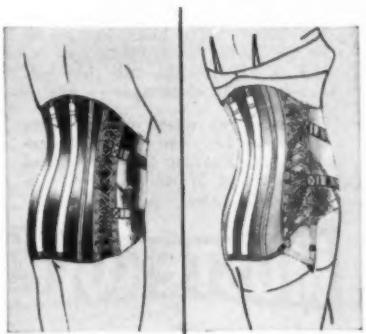

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ZINSSER'S TEXTBOOK OF BACTERIOLOGY. By David T. Smith, M.D., Professor of Bacteriology and Associate Professor of Medicine, Duke University School of Medicine; Norman F. Conant, Ph.D., Professor of Mycology and Associate Professor of Bacteriology, Duke University School of Medicine; Joseph W. Beard, M.D., Professor of Surgery in charge of Experimental Surgery, Duke University School of Medicine; Hilda Pope, Ph.D., Assistant Professor of Bacteriology, Duke University School of Medicine; D. Gordon Sharp, Ph.D., Assistant Professor of Biophysics in Experimental Surgery, Duke University School of Medicine; and Mary A. Poston, M.A., Instructor in Bacteriology, Duke University School of Medicine. Ed. 10. Cloth. Pp. 1012, with illustrations. Price $11.00. Appleton-Century-Crofts, Inc., 35 West 32nd St., New York 1, 1952.

MASSAGE AND REMEDIAL EXERCONDITIONS. By Noel M. Tidy, Member of the Chartered Society of Physiotherapy; T.M.M.G. Ed. 9. Cloth. Pp. 519, with illustrations. Price $6.00. The Williams & Wilkins Company, Mt. Royal & Guilford Aves., CISES IN MEDICAL AND SURGICAL Baltimore, 1952.

STERILITY — ITS CAUSE AND ITS TREATMENT. By J. Jay Rommer, A.B., Ph.G., M.D., A.I.C.S., Gynecological Staff, Beth Israel Hospital, Newark, New Jersey; Member, American Genetics Association, American Society for the Study of Sterility, New Jersey Neuropsychiatric Association; Fellow, New Jersey Obstetric and Gynecological Society. Part I—The Infertile Female, Part II—The Infertile Male. Cloth. Pp. 424, with illustrations. Price $12.50. Charles C Thomas, Publisher, 301 E. Lawrence Ave., Springfield, Ill., 1952.

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TEXTBOOK OF GENERAL SURGERY. By Warren H. Cole, M.D., F.A.C.S., Professor and Head of the Department of Surgery, University of Illinois College of Medicine; Chief Surgeon, Illinois Research and Educational Hospitals, Chicago; and Robert Elman, M.D., F.A.C.S., Professor of Clinical Surgery, Washington University School of Medicine; Assistant Surgeon, Barnes Hospital; Associate Surgeon, St. Louis Children's Hospital; Chief of Staff and Director of Surgical Service, H. G. Philips Hospital, St. Louis. Foreword by Evarts A. Graham, M.D., F.A.C.S. Ed. 6. Cloth. Pp. 1154, with illustrations. Price $12.50. Appleton-Century-Crofts, Inc., 35 West 32nd St., New York 1, 1952.

PHYSICAL FOUNDATION OF RADIOLOGY. By Otto Glasser, Professor of Biophysics and Head of Department of Biophysics, Cleveland Clinic Foundation, Cleveland, Ohio; Edith H. Quimby, Associate Professor of Radiology (Physics), College of Physicians and Surgeons, Columbia University, New York; Lauriston S. Taylor, Chief, Atomic and Radiation Physics Division, National Bureau of Standards, Washington, D. C.; and J. L. Weatherwax, American Oncologic Hospital and Graduate School of Medicine, University of Pennsylvania, Philadelphia. Ed. 2, revised and enlarged. Cloth. Pp. 581, with figures and charts. Price $6.50. Paul B. Hoeber, Inc., 49 East 33rd St., New York 16, 1952.

TEXTBOOK OF GYNECOLOGY. By Emil Novak, A.B., M.D., D.Sc. (Hon.), F.A.C.S., F.R.C.O.G. (Hon.), Assistant Professor Emeritus of Gynecology, The Johns Hopkins Medical School; Gynecologist-in-Chief, Bon Secours and St. Agnes Hospitals, Baltimore; and Past President, American Gynecological Society; and Edmund R. Novak, A.B., M.D., F.A.C.S., Instructor in Gynecology, Johns Hopkins Medical School; Gynecologist, Johns Hopkins, Bon Secours, St. Agnes and Union Memorial Hospitals, Baltimore. Ed. 4. Cloth. Pp. 800, with illustrations. Price $9.00. The Williams & Wilkins Company, Mt. Royal & Guilford Aves., Baltimore, 1952.

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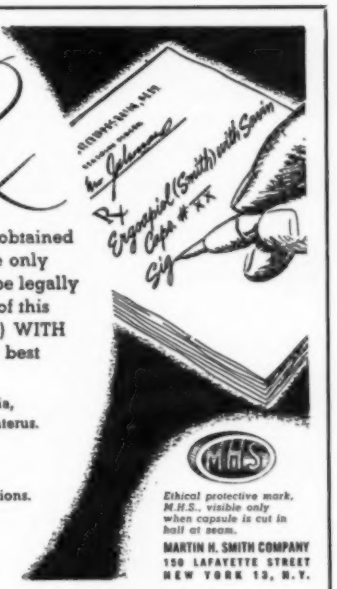

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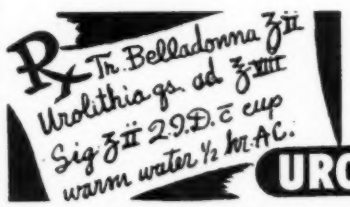
PHARMACOLOGY IN CLINICAL PRACTICE. By Harry Beckman, M.D., Director, Departments of Pharmacology, Marquette University Schools of Medicine and Dentistry; and Consulting Physician, Milwaukee County General Hospital and Columbia Hospital, Milwaukee, Wisconsin. Cloth. Pp. 839, with illustrations. Price $12.50. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1952.

DIABETIC GLOMERULOSCLEROSIS, The Specific Renal Disease of Diabetes Mellitus. By Harold Rifkin, M.D., F.A.C.P., Lecturer in Medicine, College of Physicians and Surgeons, Columbia University; Adjunct Attending Physician, Medical Division, Montefiore Hospital; Associate in Medicine and Assistant Professor, Department of Bacteriology, Flower-Fifth Avenue Hospitals, New York Medical College, New York, New York;



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THE RATIONAL TREATMENT OF CATARRH. By W. Annadale Troup, M.C., M.D., Ch.B. (St. And.). Cloth. Pp. 85, with illustrations. Price $2.50. Chaterson Ltd., 5 Johnson's Court, Fleet St., E.C.4., London; John de Graff, Inc., 64 West 23rd St., New York 10, 1952.

APPLIED PHYSIOLOGY. By Samson Wright, M.D., F.R.C.P., John Astor Professor of Physiology, University of London, Middlesex Hospital Medical School; Sometime Examiner in Physiology to the Universities of Oxford, London and Leeds; The Royal College of Surgeons of England; The Royal College of Surgeons of Edinburgh; The Conjoint Board in England; The Conjoint Board in Ireland; with the collaboration of Montague Maizels, M.D., F.R.C.P., Professor of Clinical Pathology, University of London, University College Hospital Medical School, and John B. Jepson, M.A., B.Sc., D.Phil., A.R.I.C., Senior Lecturer in Biochemistry, Courtauld Institute of Biochemistry, Middlesex Hospital Medical School. Ed. 9. Cloth. Pp. 1190, with illustrations. Price $9.00. Geoffrey Cumberlege, Oxford University Press, 114 Fifth Avenue, New York, 1952.

CARDIAC THERAPY. By Harold J. Stewart, M.D., Associate Professor of Medicine, Cornell University Medical College, New York; Attending Physician, New York Hospital; Head of Division of Cardiology, Department of Medicine, New York Hospital-Cornell Medical Center. Cloth. Pp. 622, with illustrations. Price $10.00. Paul B. Hoeber, Inc., 49 E. 33rd St., New York, 1952.

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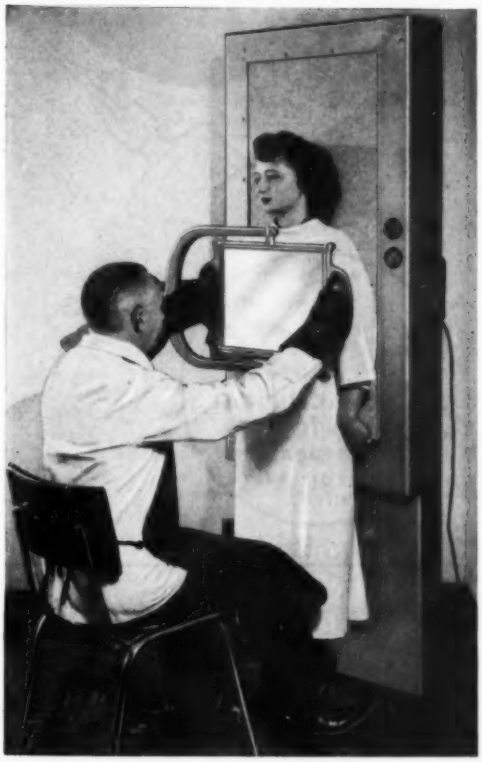

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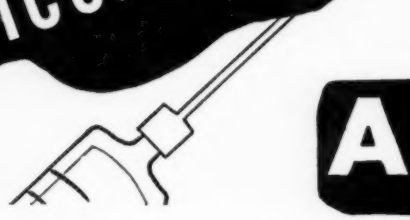

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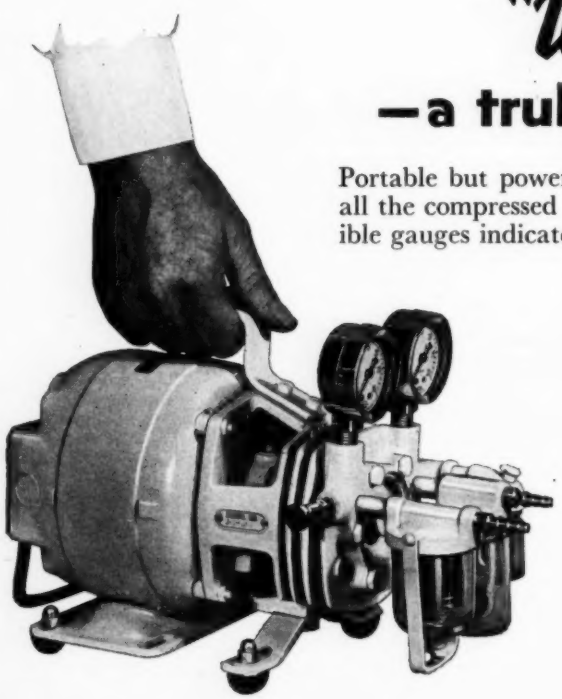

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Non-Dietary Factors in Feeding Problems

Emotional disturbances in infants and children may often be reflected in feeding problems with symptoms referable to the gastro-intestinal tract. Some of these difficulties are resolved by growth, others require therapy above and beyond dietary changes.

The literature stresses that certain G-I disorders in children can be produced by *autonomic imbalance,* and particularly excessive cholinergic (parasympathetic) impulses.

In these, the basic therapeutic need is for anti-cholinergic measures. The use of atropine (50-50 mixture of dextro- and levo-hyoscyamine) for this purpose is well-known. While the levo-form produces the necessary anti-cholinergic action, the dextro- component is the main source of atropine's central, toxic effects.

Pure levo-alkaloid of belladonna (primarily l-hyoscyamine) is available as Bellafoline.

This preparation is:

a) weight for weight twice as active as atropine

b) dose for dose half as toxic.

Bellafoline has been combined with therapeutically adequate doses of phenobarbital for antispasmodic sedative effect — Belladenal:

a) Elixir: each 4 cc. (approx. one teaspoonful) contains:
0.0625 mg. (1/1000 gr.) Bellafoline
12.5 mg. (3/16 gr.) phenobarbital
(equivalent to ¼ Belladenal tablet)

b) Tablets: each containing: 0.25 mg. (1/260 gr.) Bellafoline
50 mg. (¾ gr.) phenobarbital

The table below is a guide to:

BEST DOSAGE IN CHILDREN*

AGE	ATROPINE DOSAGE SCHEDULE	DOSAGE OF BELLADENAL ELIXIR
1 to 12 months	1/1300 gr. to 1/650 gr.	½ teaspoonful
1 to 3 years	1/400 gr.	1 teaspoonful
3 to 6 years	1/150 gr.	2½ teaspoonsful
6 to 12 years	1/150 gr. to 1/75 gr.	1 tablespoonful

* This dosage schedule is based on findings of K. R. Unna et al: Pediatrics 6: 197, 1950.

For full dosage table and complete information and references on this subject, just request "Infant Feeding Problems" literature.

Sandoz Pharmaceuticals

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". . . proved considerably more effective than methylcellulose as a bulk laxative, and (was) also superior to previous laxatives such as milk of magnesia, mineral oil, cascara or a phenolphthalein preparation."[1]

l.a.formula

As much as 8 times more effective than Methylcellulose

In a study[1] comparing the effectiveness of psyllium therapy with methylcellulose and selected irritant cathartics, the psyllium preparation, L.A. Formula, brought prompt improvement to 77.5 per cent (18 cases) of 23 patients, many with extreme bowel difficulties.

Conversely, this same group when placed on methylcellulose showed improvement in *only* 9 per cent (2 cases) of the 23 patients. Moreover, when as many as 15 methylcellulose tablets daily met with only partial success, "The large dose was objected to and refused."

In this same study, which included a total of 101 cases limited largely to a notoriously refractive group, Cass and Wolf concluded that, "In severe types of constipation from 73 to 82 per cent of patients were improved on psyllium therapy."

Berberian, et al,[2] have also reported that the addition of 1 part psyllium to 4 parts methylcellulose produced " . . . up to 87 per cent more moisture-retaining and bulk-forming power than the simple methylcellulose tablet of the same weight." This same addition of psyllium to methylcellulose produced ". . . increased bulk of stool immediately from the first day of medication, whereas plain methylcellulose caused a moderate constipative effect on the first day, followed by attainment of the new level of bulk stools only at the third day."

In addition to its demonstrated effectiveness, L.A. Formula is unsurpassed for patient acceptance. The ulcer or colitis patient, the gravida, the nursing mother, the aged and bedridden, children, your most fastidious patient—all find improved L.A. Formula pleasant and easy to take.

We encourage you to write for samples for clinical comparison

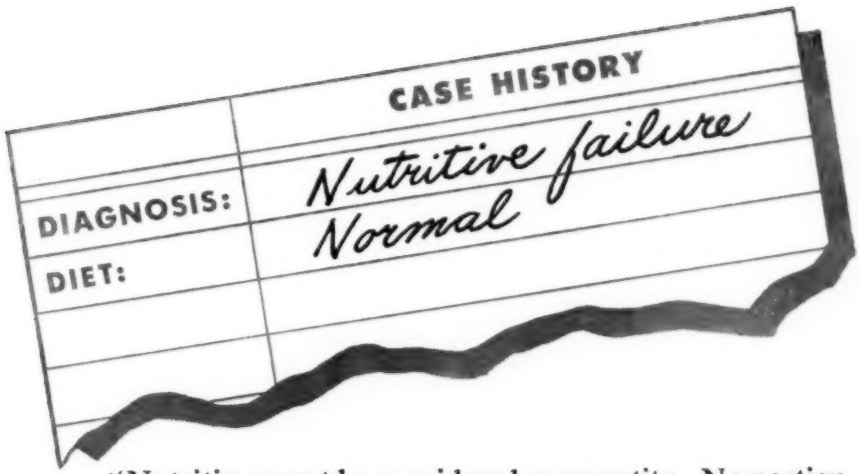
Supplied: 7 and 14 oz. cans.

Formula: 50% Plantago ovata coating dispersed in lactose and dextrose.

Burton, Parsons & Company

Washington 9, D. C.

1. Cass, L. J., and Wolf, L. P.: Gastroenterology *20*:149 (Jan.), 1952.
2. Berberian, D. A., Pauly, R. J., and Tainter, M. L.: Gastroenterology *20*:143 (Jan.), 1952.



"Nutrition must be considered as an entity. No particular constituent is more important than another. Each nutrient should be present in its optimum quantity."[1] "If one nutrient is not adequate, this may also interfere with the functioning of other nutrients in the body."[2]

Vitamins, Minerals and Trace Elements each play a specific important role in nutrition.

1. Simonnet, H.: Nutrition in Pregnancy, Canad. M. A. J., 58:556, (June) 1948, p. 60.
2. The Nutrition of Industrial Workers; Second Report of the Committee on Nutrition of Industrial Workers, Food and Nutrition Board, National Research Council. Reprint and Circular Series No. 123. (Washington, D. C.: National Research Council), Sept., 1945, p. 13.

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Vitamin D	500 U.S.P. Units
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Riboflavin	3 mg.
Pyridoxine Hydrochloride	0.5 mg.
Niacinamide	25 mg.
Ascorbic Acid	50 mg.
Calcium Pantothenate	5 mg.
Mixed Tocopherols (Type IV)	5 mg.
Calcium	213 mg.
Cobalt	0.1 mg.
Copper	1 mg.
Iodine	0.15 mg.
Iron	10 mg.
Manganese	1 mg.
Magnesium	6 mg.
Molybdenum	0.2 mg.
Phosphorus	165 mg.
Potassium	5 mg.
Zinc	1.2 mg.

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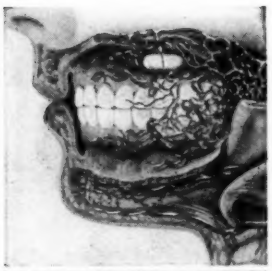

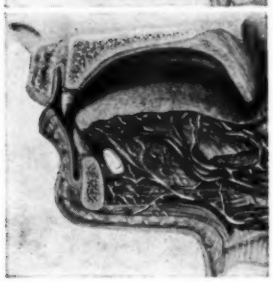

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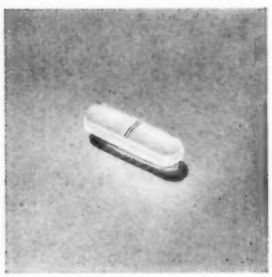

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*ESCAMILLA, R. F., AND GORDAN, G. S.: J. CLIN. ENDOCRINOL. 10:248, 1950.

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